# Are Patients Satisfied with their Total Joint Replacement Surgery? A Prospective Cross Sectional Survey

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## ABSTRACT

**Objective:** The number of patients requiring arthroplasty increases annually. Joint replacement surgery can improve a patient's (QOL) quality of life. The effectiveness of this care from a patient's own perspective assessed by patient reported outcome measures is just as important as the clinical measures. The aim of our study was to evaluate patients' satisfaction following total joint replacement procedures.

**Methods:** A cross sectional study was performed in a major regional hospital, (Port-of-Spain General Hospital, Trinidad). Between September 1st 2013 and December 31st 2014, Seventy three patients were enrolled in the study. Two groups were created: a preoperative group (with thirty nine patients) and a post operative group (of thirty-four patients). The postoperative group of patients received either total hip replacement or total knee replacement surgery from at least three months post procedure. The main outcome measures reported were: (i) Orthopaedic patient reported outcome measures, Oxford hip and knee scores. (ii) Health related quality of life instrument, short form 12 (SF12) for mental and physical components of health gained (MCS and PCS). (iii) Visual analogue scores to assess current pain. (iv) Patient satisfaction levels with peri-operative management. (v) Fulfillment of patients' expectations with respect to pain, mobility and independence.

**Results:** The pre-operative group had a mean Oxford hip score (OHS) score of 18.71, standard deviation (SD) 10.09. The postoperative group had a statistically significant higher level of functionality in terms of a mean Oxford hip score (OHS) 41.45, standard deviation (SD) 7.42. The preoperative group had more disability (lower function) in terms of a mean oxford knee score (OKS) of 15.52, SD 7.10. The post operative group's mean oxford knee score (OKS) was 37.27, SD 7.32.With respect to the short form 12 (SF12) quality of life assessment tool, the difference in mean PCS between groups was significant, pre op 28.57 (SD 7.52), post op 40.12.27 (SD 11.16). The difference in mean MCS between groups was also significant, pre op 48.76 (SD 9.02), post op 53.76 (SD 6.77). The difference in mean pain scores (VAS) between groups was significant, pre op eight (SD 1.86), post op 1.42 (SD 2.19). Postoperative patients were generally satisfied with their peri-operative management. Patient expectations were met in terms of pain, mobility and independence (92.31%, 94.87% and 94.87% respectively).

**Conclusion:** Although multiple factors impact on patient satisfaction with respect to TJR surgery, statistically significant results showed increased function (improved Oxford scores), decreased pain (VAS) and general improvement in mental and physical health gained (SF12) between independent pre and post operative groups. Clinically significant results indicate that postoperative patients were satisfied with peri-operative management and fulfillment of ex.

**Keywords:** Patient reported outcome measures (PROM), patient satisfaction, total joint replacement pectations following arthroplasty, surgeons should be aware of these issues.

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## INTRODUCTION

The usage of large joint arthroplasty surgery has increased in popularity and this is due to an ageing population suffering from degenerative joint disease (1, 2). Some authors may argue that certain parties benefit financially from these procedures (3). From our perspective, the main benefit of joint replacement surgery is an improvement in patients' quality of life, especially with respect to pain, disability and function.

Avedis Donabedian (1966) defined health outcomes as the ultimate validation of effectiveness and quality of medical care (4). Patient reported outcome measures (PROM) have been well established as an essential component to define clinical success of any surgical intervention as they provide clinicians with useful tools to measure patient outcomes (5, 6). The effectiveness of care from a patient's own perspective assessed by patient reported outcome measurements (PROMs) is just as important as the clinical measures (7).

Before the measurement of PROMs became a main-stream tool for post operative patient evaluation, emphasis was placed on the relationship between surgical procedures and revision rates, complications and morbidity/mortality (6). Older studies never truly reported on patients' perception on their undertaken surgeries (6). Several studies have investigated objective measurements of subjective viewpoints concerning Hip and Knee arthroplasty (5, 8–10). There are general and specific instruments that can measure health and functionality (11, 12).

Our aim was to assess patients' satisfaction with joint replacement performed at one institution. To the best of our knowledge, no similar study was performed in the West Indies. Our study includes validated and reliable PROM instruments to evaluate patient satisfaction with the aforementioned surgery.

## METHODS

### Study design and Population

A prospective cross-sectional analysis was performed on patients who attended the orthopaedic out patients' clinic at the Port-of-Spain General Hospital from 1st September 2013 to 31st December 2014. The sample size over this time period was seventy three (73) patients. The preoperative group contained thirty nine (39) patients and the postoperative group included thirty four (34) patients. Both groups were independent of each other as the time taken for a patient requiring total joint replacement was three years at this public institution. It was not possible to follow-up the same pre-operative cohort of patients into the post operative period. The pre operative group included any patient diagnosed with severe hip or knee arthritis by the consultant orthopaedic surgeon. Patients were excluded from the post operative group if they were within the three (3) month post operative period, had a revision procedure or a complex primary joint replacement surgery. Patients who had emergency hip surgery and hip fractures were also excluded. Post operative patients who had elective simple hip or knee surgery were included in the study. The data was collected in the surgical out-patient department of the Port-of-Spain General Hospital (POSGH). The consultant and supervised trainees of The University of the West Indies unit who performed the surgeries were not involved in data collection. The data collection was performed by an independent interviewer who did not belong to that particular orthopaedic clinic.

The participants included in the study completed the questionnaire with the independent interviewer. All participants were asked precisely the same questions in an identical format and responses recorded in a uniform manner (13).

**Questionnaire format and patient reported outcome measures**

The questionnaire consisted of three main sections which were patient characteristics, PROM instruments and a nine item satisfaction survey. The questions on patient characteristic were based on age, gender, body mass index (BMI), ethnicity, type of arthroplasty needed or received, indication for surgery and postoperative length of stay.

The PROMs used were Oxford Scores for Hip and Knee (OHS and OKS). The Short Form 12 quality of life assessment tool (SF12) was also used. The OHS and OKS consist of 12 questions directed towards patients' assessment of pain and function over the last month. Each question is based on a Likert scale taking values from 0 to 4. All the scores are summated with a total score falling within 0 and 48. Scoring zero indicates the most severe symptoms whereas scoring 48 suggests excellent joint function (14, 15).

The SF12 form consists of 12 questions consisting of two scales assessing mental and physical function. Two scores are derived which are mental and physical health composite scores (MCS and PCS) which range from 0 to 100. This corresponds to lowest to highest health levels. Both scores combine in such a way that they compare to a national norm with a mean score of 50 and a standard deviation of 10 (22).

**Satisfaction survey directed towards postoperative patients**

This consisted of questions based on (i) current pain (visual analogue scale or VAS), satisfaction levels with respect to (ii) pre-operative information given by doctor to patient, (iii) post operative care, (iv) out-patient clinic, (v) post operative physiotherapy and fulfillment of patient expectations in terms of (vi) pain, (vii) mobility and (viii) independence.

Statistical analysis and ethical approval

All statistical analyses were conducted using STATA® 11.0 Data Analysis, copyright 1984–2009 Statacorp. The statistical tests used were the independent samples *t*-test analysis after taking into consideration necessary assumptions and the Mann-Whitney test for non-parametric data. Ethical approval was obtained from the appropriate ethics committee.

## RESULTS

The sample consisted of 73 patients at baseline of whom 39 pre-operative patients and 34 postoperative patients completed the questionnaire after inclusion/ exclusion criteria were met (refer to methods section). The mean age was 63.49 years (SD 10.86) in the pre operative group. The mean age in the postoperative group was 66.00 (SD 11.02). Females dominated 75.34% (55) the males 24.66% (18). Patients were generally obese as the mean BMI was 32.82 (SD 10.52). Afro-Trinidadians were the commonest ethnicity encountered 69.86% (51) followed by Indo-Trinidadians 24.66% (18), mixed 2.74% (2) and Caucasian 1.37% (1). In one questionnaire the ethnicity was not recorded. The commonest indication for TJR surgery was primary osteoarthritis 68.49% (50), rheumatoid arthritis 19.18% (14), secondary osteoarthritis 5.48% (4), avascular necrosis 4.11% (3), lupus 1.37% (1) and non-recorded data accounted for 1.37% (1), (Table 1).

The commonest surgery required was TKR 74.36% (29) in the pre-operative group as compared to 17.95% (7) requiring THR. In the pre-operative group none recorded data accounted for 7.69% (3). The commonest post op surgery performed was primary total knee replacement (TKR) 64.71% (22) while 32.35% (11) had total hip replacement (THR).

Table 1: Baseline characteristics of patients

| | **Number** | **Mean, SD** | **%** |
|---|---|---|---|
| Age (years) pre, post op | 73 | 63,66 ; 10.86,11.02 | |
| Gender | 73 | | |
| F 55 | | | 75.34 |
| M 18 | | | 24.66 |
| BMI (mean, range, SD) | 71 (2 NR) | 32.82, 10.52 | |
| Ethnicity | | | |
| Afro | 51 | | 69.86 |
| Indo | 18 | | 24.66 |
| Mixed | 2 | | 2.74 |
| Caucasian 1 | | | 1.37 |
| NR 1 | | | 1.37 |
| Indication | Pre | Post | |
| Primary osteoarthritis | 31 | | 19 |
| Avascular necrosis | 2 | | 1 |
| Rheumatoid arthritis | 5 | | 9 |
| Secondary OA | 0 | | 4 |
| Lupus | 0 | | 1 |
| Not recorded | 1 | | 0 |
| **Total (n, %)** | **73** | | **100** |

SD – standard deviation, F – female, M – male, BMI – body mass index, NR not recorded

Non recorded data accounted for 2.94% (1) surgery. The average length of Hospital stay was 7.73 days (SD 4.8). In terms of postoperative complications, 72.73% of patients had none, 6.06% (2) had superficial surgical site infection, wound dehiscence and intra-operative anaesthetic complications, respectively. Acute chest syndrome, bleeding and acute kidney injury each accounted for 3.03% (1) of the complications.

All of the outcome scores showed a significant improvement in the postoperative group as compared to the pre-operative groups. Independent *t*-test analysis was applied to pre and post operative group data with respect to PROMs. The pre-operative group for OHS had a mean score of 18.71 and standard deviation (SD) of 10.09, respectively whereas the postoperative group measured 41.45 [SD 7.42] – (Table 2). The mean OKS was 15.52 (SD 7.10) in the pre-operative group and 37.27 (SD 7.32) in the postoperative group – (Table 2). The difference in mean pain scores (VAS) between groups was significant; pre op 8 (SD 1.86), post op 1.42 [SD 2.19] – (Table 2).

The difference in mean PCS between groups is significant, pre op 28.57 (SD 7.52), post op 40.12.27 [SD 11.16] - (Table 2). The difference in mean MCS between groups is significant, pre op 48.76 (SD 9.02), post op 53.76 [SD 6.77] – (Table 2).

Table 2: Patient Reported Outcome Measurements and respective mean values, standard deviations and p-values comparing independent pre and postoperative groups

| **PROM** | **Mean** | **Standard deviation** | ***p*-value** |
|---|---|---|---|
| OHS | | | 0.000 |
| Pre op | 18.71 | 10.09 | |
| Post op | 41.45 | 7.42 | |
| | | | |
| OKS | | | 0.000 |
| Pre op | 15.52 | 7.10 | |
| Post op | 37.27 | 7.32 | |
| | | | |
| VAS | | | 0.000 |
| Pre op | 8.00 | 1.86 | |
| Post op | 1.42 | 2.19 | |
| | | | |
| MCS | | | 0.01 |
| Pre op | 48.76 | 9.02 | |
| Post op | 53.76 | 6.77 | |
| | | | |
| PCS | | | 0.000 |
| Pre op | 28.57 | 7.52 | |
| Post op | 40.12 | 11.16 | |

PROM – patient reported outcome measure, OHS – oxford hip score, OKS – oxford knee score, VAS – visual analogue scale, MCS – mental health composite score, PCS – physical health composite score. Statistical test used – independent *t*-test.

Effect sizes also varied from moderate to strong magnitude of treatment effect according to outcome instrument used. The effect size between groups for OHS and OKS was 0.847 and 0.789, respectively (high to moderate). There was also a moderate effect size (0.542) comparing groups using VAS. However, the relative magnitude of effect was high for the SF12 scores, PCS (0.903), MCS [0.972] - (Table 3).

Table 3: Patient Reported Outcome Measurements and Effect Sizes

| PROM | Effect size |
|---|---|
| OHS | 0.847 |
| OKS | 0.789 |
| VAS | 0.542 |
| MCS | 0.972 |
| PCS | 0.903 |

OHS – oxford hip score, OKS – oxford knee score, VAS – visual analogue scale, MCS – mental health composite score, PCS - physical health composite score

Satisfaction levels were done in accordance to a Likert scale ranging from one (extremely satisfied) to 10 (completely dissatisfied) in the postoperative group. In terms of patient satisfaction with "preoperative information given" 54.55% (18) of the post op patients were very satisfied, 39.39% (13) were satisfied and 6.06% (2) were of neutral opinion. Post op patients were either satisfied 51.52% (17) or very satisfied 48.48% (16) with "Time spent in outpatient clinic". Patient satisfaction with "Postoperative care" varied between 9.09% (3) neutral or dissatisfied and the majority being satisfied 42.42% (14) or very satisfied 39.39% (13).

Satisfaction with "Postoperative physiotherapy" varied among post op patients; 30.30% (10) very satisfied, 42.42% (14) satisfied, 18.18% (6) neutral, 6.06% (2) dissatisfied and 3.03% (1) very dissatisfied.

Patients' expectations with joint replacement surgery were evaluated by assessing three outcomes; (i) pain, (ii) mobility and (iii) independence. Patients' response rate was 92.31% (36) in terms of pain relief. The response rate was 94.87% (37) in terms of restoring mobility and achieving independence, (Table 4).

Table 4: Patient expectations being met in terms of pain, mobility and independence (Pre op)

| **Where patients' expectations met In terms of…?** | **Yes** | **No** | **Do not know** |
|---|---|---|---|
| Pain (%) | 92.31 | 0 | 7.69 |
| Mobility (%) | 94.87 | 0 | 5.13 |
| Independence (%) | 94.87 | 0 | 5.13 |

**N = 39**

## DISCUSSION

The main findings were as follows, First Oxford Hip and Knee Scores were significantly higher in the postoperative group compared with the pre-operative group. Secondly, TJR improves function and decreases pain and disability in patients who received both hip and knee surgeries.

Thirdly, arthroplasty significantly improved the mental health in the postoperative group compared to pre-operative group. Fourth, the physical component of health was significantly higher in the postoperative group than pre-operative group.

In general postoperative patients were satisfied with peri-operative care in terms of pre-operative information with respect to surgery, postoperative ward care, out-patient clinic management and postoperative physiotherapy. Patient expectations were mostly met in the postoperative group in terms of diminishing pain. Most were met in terms of achieving independence and reducing disability. These results were not statistically significant but clinically important.

A prospective study done by Dawson, Fitzpatrick, Carr and Murray (1996) developed a questionnaire to measure outcomes in 220 THR patients that was valid and reliable (16). Our study did not do this but utilized a few well validated and reliable PROM tools such as OHS, OKS and SF12 instead.

Another prospective cohort study by Scott, Buglar *et al* (2012) investigated patient's perception of arthroplasty of hip (346 THR) and knee (323 TKR) pre and post-surgery and found similar results in terms of fulfilling patients' expectations in terms of pain relief and increased mobility (17). Similar to our findings, they found that there was a greater improvement in OHS than OKS.

Patient factors were shown to be more influential on PRO than surgical factors in the multi-regression analysis of the National Joint Registry by Baker, Deehan *et al* [2012] (18). Even though our study did not investigate how surgical and implant factors influenced patient satisfaction it showed significant improvement in OKS and QOL assessment tools in the post op group receiving arthroplasty.

Hamilton, Henderson *et al* (2012) concluded in their prospective cohort study that both total hip arthroplasty (THA) and total knee arthroplasty (TKA) confer substantial improvement in patient outcome; however, greater joint specific, general health and satisfaction scores are

reported following THA (19). Our study also showed a greater improvement in OHS compared to OKS as well as improvements in Quality of Life (QOL) scores.

Ostendorf , Van Stel, *et al* (2004) compared five health instruments which showed OHS having a large magnitude of effect and it was the more specific disease questionnaire tested in their study (11). The OHS also had a large effect size in the PROM instruments used in our study (11). Even though we showed that patients' expectations were fulfilled with respect to TJR, Allvin, Kling, Idvall *et al* (2012) discussed that patients receiving hip and knee surgery hoped to achieve a level of physical function far superior to that before surgery (20). Their study also utilized postoperative recovery profile questionnaires assessing recovery levels from one month postoperatively onwards. Our study excluded post operative patients within three months of surgery (20).

A large prospective cohort study by Murray, Carr *et al* (2011) identified a value of OHS and change in OHS which predicts patient satisfaction at twelve and twenty-four months within a standard clinical setting (21). Our smaller study identified no such cut off point for either OHS or any other PROM tool (21).

Strengths of this study included the use of validated and reliable tools in the questionnaire and the use of PROM instruments as an objective assessment of patient satisfaction. However, peri-operative satisfaction levels and expectations questionnaire were not validated. This study has never been done in our population and is novel.

Two independent groups were compared for treatment, a cohort study or RCT would have been more adequate. However long waiting lists (2–3 years) currently exist in the public setting eradicating the application of these higher level studies. There are no databases or joint registries in existence in our local setting further impeding efficient data collection for analyses.

Recruitment of subjects was confined to one unit in one hospital. The population of Trinidad and Tobago would be better represented if other tertiary institutions/ units were involved. Also the postoperative group only consisted of patients who received simple primary joint replacement surgery.

In addition to being the first of its kind in the region, this study justifies the benefit of PROM in assessing patients' satisfaction with TJR surgery. It also exposes the short comings of our health sector with relation to lack of national joint registries and almost non existence of application of PROM to assess arthroplasty. Inadequate operating time due to higher priority trauma and generally large patient numbers often give rise to long TJR waiting lists and extreme difficulty in non-computerized data collection.

Although multiple factors impact on patient satisfaction with respect to TJR surgery, statistically significant results showed increased function (improved Oxford scores), decreased pain VAS and improvement in mental and physical health gained (SF12) between independent pre and postoperative groups. Clinically significant results indicate that postoperative patients were satisfied with peri-operative management and fulfillment of expectations following arthroplasty. Surgeons need to be aware of these issues. Administrative efforts should aim towards implementing official national joint registries and introducing policies to better facilitate patients requiring TJR surgery in order to enhance patients' quality of life.

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This study had no sponsors

## CONFLICTS OF INTEREST

There are no conflicts of interest

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