



Original Research Article

## Level of Physical Activity and Quality of Life Post Total Hip Joint Replacement Surgery

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Received: 09/09/2014

Revised: 06/10/2014

Accepted: 08/10/2014

### ABSTRACT

**Background:** Evaluation of the results of Total Hip Replacement (THR) traditionally has focused on mortality rates, surgical and technical aspects, survival rates, and assessment by the treating surgeon. Patients today have high expectations in the ability to return to a higher level of physical functioning as an important goal of surgery. There is a lack of data on long term functional outcome after THR surgery in India, so the aim of the study is to evaluate effect on functional status and quality of life, long term functional outcome predictors and long term quality of life predictors after THR and to correlate SF 36 and Harris Hip rating scale.

**Methodology:** A questionnaire based survey was conducted among sample size of 35 THR patients underwent surgery six months to one year before. Two scales were used as outcome measures SF 36 and Harris Hip Rating Scale

**Results:** Statistical analysis showed role physical as least improved component of SF 36 and social functioning as maximally improved component of SF 36. Harris hip rating scale and SF 36 showed moderate positive correlation of 0.66 within which mental components of SF 36 and Harris hip rating score showed a mild positive correlation of 0.39 and physical components of SF 36 and Harris hip rating score showed moderate positive correlation of 0.55

**Discussion & Conclusion:** This finding supports the idea that Quality of life does not improve in consistence with functional improvement, mental components show improvement compared to physical components.

**Key words:** Total hip joint replacement surgery, Physical activity, Quality of life, Long term.

### INTRODUCTION

Hip joint replacement is a surgical procedure whereby replacement is done with prosthesis, either acetabular, femoral head or both may be replaced during surgery. The most common causes are osteoarthritis, rheumatoid arthritis, fracture neck femur,

Paget's disease and bone tumors. The number of artificial joints implanted worldwide has increased dramatically over the last 20 years. [1] Currently about 20% of Total Hip Replacement (THR) surgery is performed in people younger than 60 years with variable diagnoses; the general increase

in life expectancy is expected to further increase the need for this procedure, especially in younger age group. [2]

Evaluation of the results of THR traditionally has focused on mortality rates, surgical and technical aspects, survival rates, and assessment by the treating surgeon. [3,4] More recent studies have patient-reported health outcomes, such as pain relief, joint function, health-related quality of life, and patient satisfaction after THR, are increasingly reported. [5-7] Besides these aspects, it is important to analyze physical functioning because these limitations also are associated with decreased quality of life, increased risk of disability or depression, and increased health care costs. [8] Furthermore, patients today (specially, those who are younger and more active) have high expectations regarding functional outcome after THR. For many patients, an important goal of surgery is the ability to return to a higher level of physical functioning. [9] However as reported in previous study a discrepancy often exist between expectations of the patients and those of the surgeon. [10] Therefore, patients need to be well informed about potential recovery of physical functioning after THR. [11]

Harris Hip Score (HHS) has been successfully used for the evaluation of physical function and pain relief in patients who undergo operations for degenerative disorders of the hip. [12-19] However, it has been argued in previous studies that the HHS does not measure quality of life for THR patients. [20-22] Therefore, those outcome measures which are specific in evaluating quality of life may enhance the ability to assess overall outcomes in THR patients. [23-26] As compared with disease-specific measures or traditional scoring systems, a generic measurement of outcome should also be used to assess the patient's perception of functional status and well-being post surgery and to measure the

benefit of healthcare interventions. [27-30] The Medical Outcomes Study (MOS) 36-Item Short-Form Health Survey (SF-36) is a widely used general health-related survey that measures quality of life, the SF-36 has been shown to discriminate between patients at different stages of disease for a variety of different disease conditions, which indicates that it is applicable for the assessment of THR overall outcomes. [31-34]

Generic outcome measures are defined as the one which assess subjective general health status with comparisons across different disease states and treatment options and disease specific measures are defined as the one which focus solely on symptom and disabilities relating to particular condition but are not particular to the joint of assessment and joint specific measures are defined as the one specific to the joint of assessment and attempt to exclude the influence of co morbidities joint specific is the one. [35]

In Indian population there are varied demographic variations and also the activities of daily living places different amount of joint stress as compared with population of other countries and there is no data on long term outcomes of functions and quality of life post total hip joint replacement surgery. A comprehensive approach requires the combined use of generic and disease-specific patient-oriented validated measures, but there is a lack of data on the long-term outcome of total hip joint replacement procedures, as assessed by these validated tools in Indian population. [36]

So this study was conducted in Indian population to know long term effects of both quality of life and functions post THR surgery to give proper information on long term effects of surgery which is the focus of this study. So the goals of the study were to: 1) evaluate long term functional outcome and quality of life predictors after

total hip joint replacement surgery and 2) correlate the functions and quality of life post hip joint replacement surgery.

**MATERIALS AND METHODS**

All the 35 subjects were recruited after the ethical approval. An informed consent was obtained from all the subjects prior to data collection. Inclusion criteria for the subjects were a total hip joint replacement surgery 6 months to 1 year before. Those subjects with joint infection, malignancy, neuromuscular disease, previous hip surgery, mental impairment, poor general health status were excluded from the study.

**Procedures**

A questionnaire based survey was conducted by interviewing subjects using Harris Hip Score and SF 36 Scales. Harris hip rating scale measures response to Pain, Limp, Support, Distance Walked, Sit, Enter public transportation, Stairs, Put on shoes, Absence of deformity, Range of motion . The total scoring is out of 100. Higher the score, greater the functions. SF 36 measures response to physical and mental health status documenting response to domains of physical functioning, role limitations due to physical health, bodily pain, general health perception, vitality, social functions, role limitations due to emotional health, general mental health. Higher scores perceive better health. The collected data were analyzed using MS excel 2007 and SPSS version 16 software

**RESULTS**

35 subjects with an age group of 55 to 68 years and a mean age of 63 years participated in the study. The data were analyzed using MS excel and SPSS version 16 software. Data analysis and graphical representation was done in which Figure 1 shows all the components of SF 36 scale in which role physical shows least

improvement of 60% and social functioning shows maximum improvement of 82% and Harris hip score shows mean of 77%.

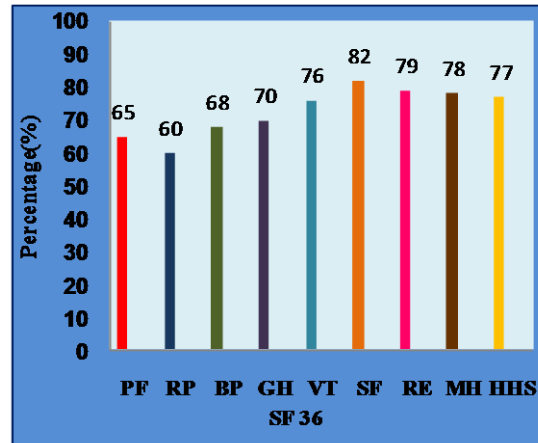


Figure 1: Components of SF 36 showing quality of life and HHS showing functions post THR cases. Each abbreviation in the x axis are read as; PF: Physical Functioning, RP: Role-Physical, BP: Bodily Pain, GH: General Health, VT: Vitality, SF: Social Functioning, RE: Role Emotional, MH: Mental Health, HHS: Harris Hip Score.

Statistical analysis is done to show effects of THR surgery on quality of life in which Figure 2 shows Karl Pearson’s correlation that was done between Harris hip score and physical components of SF 36 , which shows a mild positive correlation of 0.39 (p = 0.001)

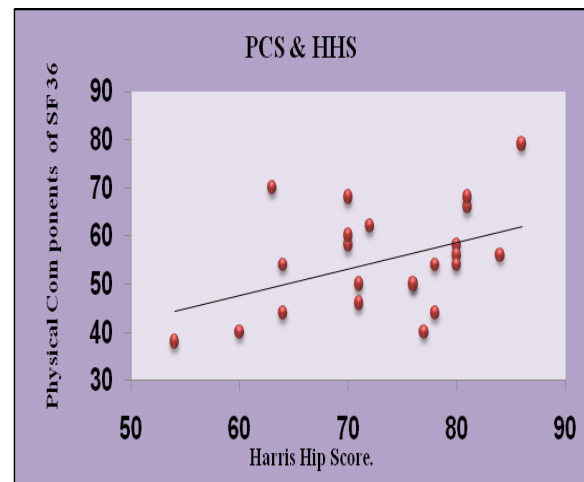


Figure 2. Scatter plot of Physical Components of SF 36 and Harris Hip Score. Abbreviations read as PCS: Physical Components Score, HHS: Harris Hip Score

Figure 3 shows mental components of SF 36 and Harris hip score which shows a moderate positive correlation of 0.55 (p = 0.000) .

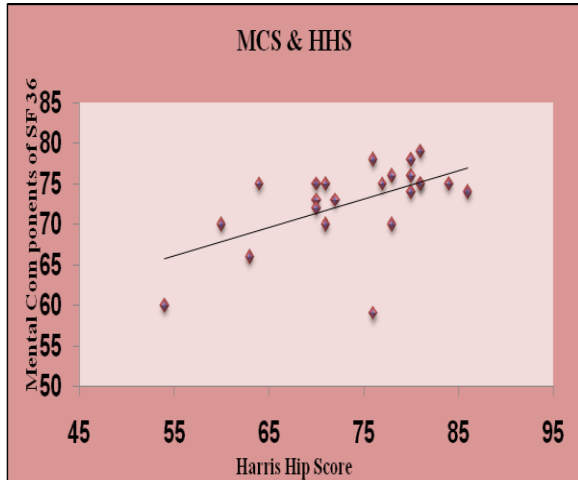


Figure 3. Scatter plot showing Mental Components of SF 36 and Harris Hip Score. Abbreviations read as MCS: Mental Components Score, HHS: Harris Hip Score

Figure 4 shows SF 36 total scoring and Harris hip score which shows a moderate positive correlation of 0.66(p = 0.000).

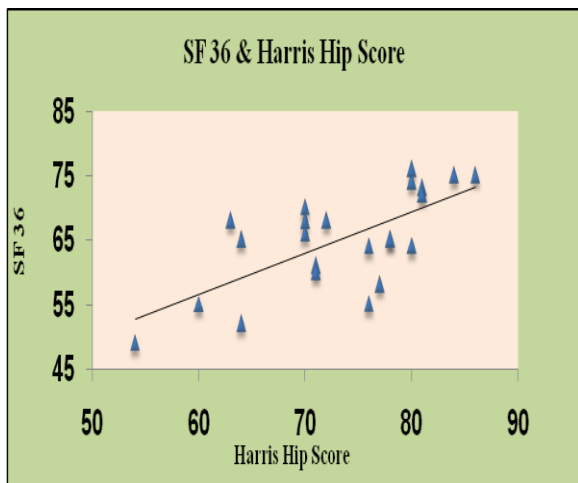


Figure 4. Shows scatter plot showing total scoring of SF 36 and Harris Hip Score

Figure 5 the line graph shows progression of physical components, mental components and Harris hip score of all the subjects in which mental components of SF 36 and Harris hip score shows steady progression and physical components does not show

steady and gradual progress as compared to the other two.

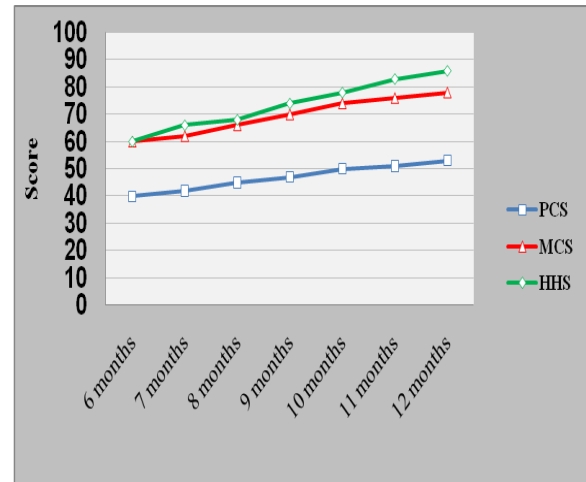


Figure 5. Showing progressions of functions and Quality of life from 6 months to 1 year post THR cases. Abbreviations read as PCS: Physical Components Score, MCS: Mental Components Score and HHS: Harris Hip Score

## DISCUSSION

The main result of the study is that though overall quality of life is good post operatively, physical quality of life does not depict much improvement as compared to mental quality of life in long term effect of total hip joint replacement surgery. In the present study, the focus is on the time trend of quality of life and functions post surgery, a long term effect was chosen to ensure that the observations have if any, short term frustrations and loss of subjective well being due to a major surgical procedure. [37] 6 months to 1 year post operative period was chosen because most of the changes in physical functioning occur within the duration of this 6 months and this duration is considered as most appropriate to monitor post operative changes. [38,39] It was believed after 26 weeks, some improvement may occur, but studies have shown only a limited improvement of physical functioning may be expected after the first 6 months. [40] A previous long-term study used a different validated questionnaire (i.e. the Nottingham Health Profile) that measures patient

evaluation of the functional, social and emotional impact of chronic disease. This study showed impaired quality of life in patients who had undergone THA 15 years earlier. These patients fared worse than the control group in most areas of perceived health. Moreover, they considered daily function to be affected negatively by health problems as compared with the control subjects.<sup>[41]</sup> Another long term study, by Rat et al reported SF-36 scores similar to 10 years after THR. These authors also found that the scores on both physical and mental scales of SF-36 were lower than those for a general population with comparable age.<sup>[42]</sup> In the present study Social function, role-emotional, vitality help gain better quality of life to the selected sample of patients because it enhances their physical, cultural and emotional social functioning which helps them achieve increased quality of life score.<sup>[37]</sup> Decrease in body pain, leads to increase in feeling of well being which improves mental health and general health of the subjects. Decreasing pain and discomfort may be more important for them than increasing their actual physical activity.<sup>[40]</sup> Study sample was in an older age group so achieving average physical functioning indicates effectiveness of surgery in terms of its impact on quality of life and overall health status.<sup>[37]</sup> Study sample shows decreased physical components in contrast to mental components, could be because overall physical functioning takes more time for full recovery after surgery than mental functioning, especially in selected age group.<sup>[37]</sup> Another reason for the relatively minor changes in post operative physical activity level could be the amount of actual physical activity level before the surgery.<sup>[40]</sup> Groot et al reported many patients with end-stage Osteoarthritis of the hip or knee maintain a relatively high activity level before surgery, despite pain and limitations, so less extreme changes after surgery are

expected.<sup>[43]</sup> Previous study have shown that the patients did not adopt a more active lifestyle post surgery in spite of improved function, capacity, and self-reported physical functioning 6 months after surgery.<sup>[40]</sup> This study also reported that post surgery, patient's capacity during "performance tests" improved as compared to pre operative status, where as their "activity level" remained same as it was pre surgery. The only difference was because of increased capacity post surgery, the patients perform their activity with less pain and less limitations as compared pre operatively. Perhaps the patients are satisfied knowing they can do more if they want to without experiencing pain and fatigue which may result in them experiencing improved feeling of well being resulting in improved mental components of quality of life.<sup>[40]</sup>

Although muscle myography is not conducted in subjects, because our study focused mainly on post operative functions and quality of life, many previous studies show that frail elderly persons with sarcopenia (degenerative loss of skeletal muscle mass and strength associated with aging) are more prone to musculoskeletal-related surgery, and post operative immobilization after THR surgery leads to further changes in the skeletal system, with potentially grave consequences.<sup>[44]</sup> Many post operative elderly patients fail to regain their preoperative level of function and self-care.<sup>[45]</sup> Immobilization due to major surgery can cause a severe decline in muscle mass, muscle strength and muscle function post operatively and as THR is a major surgical procedure, it can be attributed as one of the reason for reduction in score of physical components of SF 36.<sup>[46-48]</sup> Muscle strength declines 4% per day during the first week of immobilization, making it very important that physical training is commenced as soon as possible after surgery.<sup>[49]</sup> Aging and disuse are two of the



main conditions leading to skeletal muscle atrophy in humans, so more consideration should be given to physical therapy post operatively. [50] In both conditions, the loss of muscle mass leads to a decrease in muscle force production, and there may also be a significant additional contribution from changes in muscle architecture. [51] The loss of muscle mass with aging accelerates from the sixth decade onward, partly owing to a decreased number of muscle fibers and also as the result of general muscle fiber atrophy. Cross-sectional studies indicate that type II fibers are more vulnerable to the aging process than type I fibers [49] but other studies have found more marked type I atrophy. [50] Muscle mass has been estimated to decrease by 30% during the life Span [52,53] and maximal muscle strength is reduced as a result of aging by~1.5% per year from the sixth decade onwards. [54] Muscle strength has also been shown to decrease approximately 50% from age 30 to 80. [55] Marked alterations in muscle architecture potentially contribute to loss of muscle strength [56] and muscle fiber pennation angle reduction of 10-13% in old compared to young individuals suggests this. [57] So, all this may lead to decrease physical components of SF 36 in selected age group. The current study could not give any information regarding patients expectation after THR because it was one time study conducted post operatively with no pre operative data to suggest any effects post operatively

In summary, we found there is difference in improvement in “Quality of life” and “functions” post THR surgery, improvement is not seen in all aspects of quality of life, even though with significant improvement in functions.

## CONCLUSION

The study concludes moderate positive correlation between functions and

quality of life, within which mental components show moderate correlation with functions and physical components show mild correlation with functions. Thus finding supports the idea that Quality of life does not improve in consistence with functional improvement, mental components show improvement compared to physical components. In physical functioning, role-physical shows least improvement as compared to all components of SF 36 and social functioning shows maximal improvement.

## ACKNOWLEDGEMENT

To all the subjects who participated in the study.

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How to cite this article: Mathi EJ, Shroff RA, Sreeraj SR. Level of physical activity and quality of life post total hip joint replacement surgery. *Int J Health Sci Res.* 2014;4(11):150-158.

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