



## ANALYSIS OF FUNCTIONAL OUTCOME OF TOTAL HIP REPLACEMENT IN PEOPLE WITH LOWER SOCIO ECONOMIC STATUS

### Orthopaedics

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### ABSTRACT

**Background & Objectives:** Total hip Arthroplasty is one of the most successful and cost-effective treatment for end-stage arthritis. An individual's socioeconomic status, typically based on income and educational level, occupation and cultural practices has been shown to have an effect on the long term functional outcomes of total hip arthroplasty. Most of the studies on lower socio economic status and total hip Arthroplasty have been reported from western literature. The purpose of this study was to investigate the functional outcome of total hip arthroplasty and to analyze specific dimensions of total hip arthroplasty in lower socio economic population from Tamil Nadu.

**Materials & Methods:** I analysed a total of 20 patients [10 females and 10 males] in the age group of 35- 60 yrs. with a mean age of 49 years, who had undergone total hip replacement in our hospitals and other private hospitals had been followed up. These people are categorized by modified Kuppasamy classification-2007. Outcome measures used were Harris hip score; visual analogue scale and patient's level of satisfaction.

**Results:** There was a significant improvement in Harris hip scores at 6 months compared to pre-operative scores in 50% of patients. Of the twenty patients, five had dislocation, one patient had infection. Seven patients had radio lucent areas in the acetabular zone and femoral zones, three patients had underwent secondary procedures for complications following THR. In my study Nearly 60 % (Twelve in number) of our patients had suffered from complications. Functional outcome of the patients was evaluated using modified Harris hip score, eight had excellent outcome, seven patients had good and three had fair outcome, two patients had poorer outcome.

**Conclusion:** Total hip replacement is increasingly done for the patients from lower socio economic status because of state funding and health insurance. There is a relative lack of evidence from Indian literature on the functional outcome of total hip arthroplasty in this sector of people. People with lower socioeconomic status had a greater severity of hip disease with mean Harris hip score of 38 and pre op visual analogue scale of 9.5. Lower income and lesser education contribute to poorer outcome and adverse complications after total hip arthroplasty..

By proper health education, thereby creating awareness among them and providing improved access to health care for those with lower income and education, we can decrease the disparity in the outcome in this specific population.

### KEYWORDS

#### INTRODUCTION

Total hip arthroplasty is one of the most successful and cost effective treatments for end-stage arthritis. Incidence of total number of hip replacements for past one decade is exponentially increasing in India. Till recent past, people with cost affordability and people from higher socio economic status with sedentary lifestyle were under went replacement surgery. Lately, total hip replacement surgeries were increasingly done for lower socio economic class people in south India. An individual's socioeconomic status usually depends on income and educational level, which have been shown to have an impact on the outcomes of total hip arthroplasty. Recognizing the differences in outcomes and identifying ways to reduce the differences will be beneficial to individuals undergoing total hip arthroplasty, which will build a better foundation for future orthopaedicians.

This paper studies the follow up results and complications of total hip replacements in lower socio economic condition and how their daily routine activities like sitting cross-legged, squatting, carrying heavyweights, strenuous physical activity are influencing the outcome. The patients had been operated for total hip replacement and they have been followed up periodically at regular intervals. The outcome analyzed based on the clinical, radiographic assessment and hip scoring systems, and factors like pain relief, function, activities of daily living and early complication like infections, dislocation, loosening and difficulties in activities related to low socio economics status.

#### MATERIALS & METHODS

##### AIMS & objectives of the study

- To analyse the functional outcome of total hip arthroplasty in people belonging to lower socio economic group people.
- To analyse specific problems of hip arthroplasty in lower socio economic group people.

##### Source of Data

This prospective study was carried out from June 2018 to May 2019 in patients who underwent total hip Arthroplasty for various hip problems in the Department of Orthopaedics, Balaji Medical College, Chrompet, Chennai. The patients were operated in our hospital and who were underwent hip replacement under the state government scheme at other hospitals and had followed up at our hospital.

#### Scoring system

The careful assessment of pre operative hip status and the results is necessary to evaluate and compare different methods of treatment in hip surgery this is difficult because of the many factors involved. Modified Harris Hip Scoring System is a reliable method of assessment based on simple and well defined objective and subjective criteria which includes Pain, Function, Range of Motion, and Absence of deformity. The maximum score with this system is 100 with 44 points for pain, 47 points for function, 5 points for range of motion, 4 points for absence of deformity. Based on the Harris Hip Score (HHS), the results were divided into excellent, good, fair and poor as below:  
Excellent: > 90 points Good: 80-89 points  
Fair: 70-79 points  
Poor: <70 points

In India socio economic classification is done using the modified kuppasamy scale it uses three criteria which are enumerated below

(A) Education	Score
1. Profession or Honours	7
2. Graduate or post graduate	6
3. Intermediate or post high school diploma	5
4. High school certificate	4
5. Middle school certificate	3
6. Primary school certificate	2
7. Illiterate	1
(B) Occupation	Score
1. Profession	10
2. Semi-Profession	6
3. Clerical, Shop-owner, Farmer	5
4. Skilled worker	4
5. Semi-skilled worker	3
6. Unskilled worker	2
7. Unemployed	1

#### (C) Family income per Month (in Rs)

S. No	Modified for 1998	Modified for 2007	Income per Month	Score
1	2000	13500	19575	12
2	1000-1999	3750-13499	9788-19574	10
3	750-999	5050-6749	7323-9787	6
4	500-749	3375-5049	4894-7322	4

5	300-499	2025-3374	2936-4893	3
6	101-299	676-2024	980-2935	2
7	<100	<675	< 979	1

<b>Total Score</b>	<b>Socioeconomic class</b>
26-29	Upper (I)
16-25	Upper Middle (II)
11-15	Middle Lower middle (III)
5-10	Lower Upper lower (IV)
<5	Lower (V)

**Surgical procedure**

Patient preparation: patient is prepared extending from the anterior superior iliac spine to the toes with sterile betadine scrub. Antibiotic prophylaxis: Give the first dose or antibiotics within an hour before the skin incision. Anesthesia: epidural/spinal Position the patient in either the lateral or supine position.

**Exposure**

In the anterolateral exposure, make an incision directly over the proximal lateral femur centered on the greater trochanter. The iliotibial band is divided in the direction of its fibers and the interval between the tensor fascia lata and gluteus maximus is split, a retractor is placed over the ilium to hold the soft tissues out of the field. In the posterior exposure, incision is made centered over the greater trochanter. The distal limb is parallel to the femur and the proximal limb is parallel to the gluteus maximus muscle fibers. The iliotibial band is split in the direction of its fibers and the fascia of the gluteus maximus is split using a muscle-splitting technique. Sciatic nerve is identified and preserved. The piriformis tendon is identified and its fascia is divided. The short external rotators from the posterior femur is cut and retracted to expose the posterior hip capsule. Then capsular incision made inferiorly and superiorly that extends from inferior to superior, then take the capsule down from the femur, leaving it attached to the posterior wall of the acetabulum.

**Hip joint**

Dislocate the hip and identify the lesser trochanter. With the neck guides, femoral neck is osteotomized with an oscillating saw. Retractors are placed carefully all around the acetabulum to avoid injury to neurovascular structures.

**Acetabular cup**

Cemented Acetabulum, All remaining soft tissues and cartilage are removed from the acetabulum. Transverse acetabular ligament is preserved. sequential reaming of the acetabulum done to create a hemisphere of bleeding subchondral bone. Holes for cement fixation made in the ilium, pubis, and ischium. Trial reduction done. Cement is inserted into the socket and the bone. Socket is inserted into the acetabulum. The optimal inclination of the socket is 45 degrees. The optimal degree of ante version is 20 degrees.

**Uncemented acetabulum**

Osteophytes and soft tissues are removed to visualize the acetabulum. Transverse ligament is excised. Sequential larger reamers were used to expose a bleeding hemisphere of subchondral bone. Trial reduction done. Prosthesis of size 1 or 2 mm larger than the size of the last reamer to obtain a good press-fit. Acetabular screws is used to augment the fixation. The best area is the superior dome of the acetabulum in the ilium. Trial liner in the socket is placed.

**Femoral preparation Cemented femur**

Femur is prepared with broaches. Trial reductions is Performed and anterior and posterior hip stability, leg length, and soft-tissue tension is verified. The intramedullary canal is cleaned with pulsatile lavage and dried. The cement is introduced into the canal by finger packing technique. Femoral component is Introduced into the canal and held it in proper position until all cement has hardened.

**Uncemented**

Femur is prepared with broaches. Trial reductions is Performed and anterior and posterior hip stability, leg length, and soft-tissue tension is verified. Press fit fixation of femoral stem obtained. Irrigation of the wound and fragments of cement or bone are removed. Good hemostasis obtained.

**Wound closure**

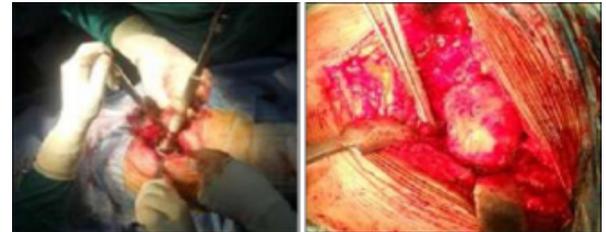
In anterolateral approach, the gluteus minimus, medius, and vastus

lateralis muscles to their beds is reattached using strong absorbable or nonabsorbable sutures passed through bone. In posterolateral approach, capsule and short external rotators to the posterior aspect of the abductors and the greater trochanter is reattached.



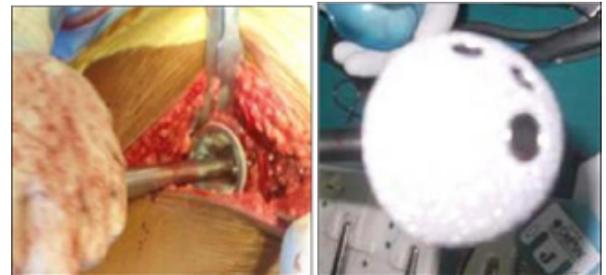
Lateral Position

Skin Incision



Arthritic femoral head

acetabular preparation



Uncemented Acetabular Cup

Acetabular Cup Insertion



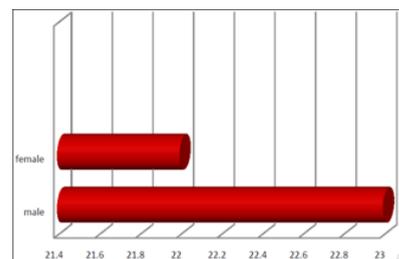
Uncemented Stem

Stem Insertion

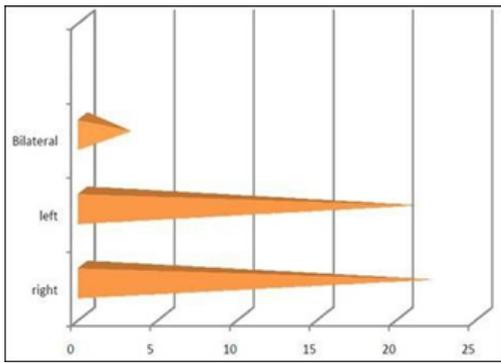


Femoral Head Placement

Wound Closure



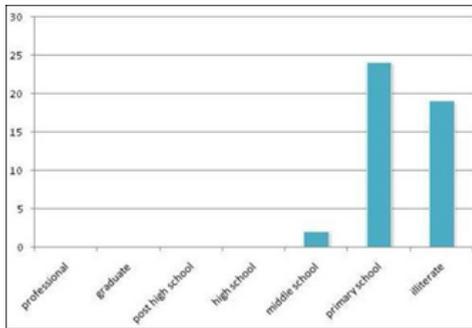
**Results**



**Fig 3: Side**

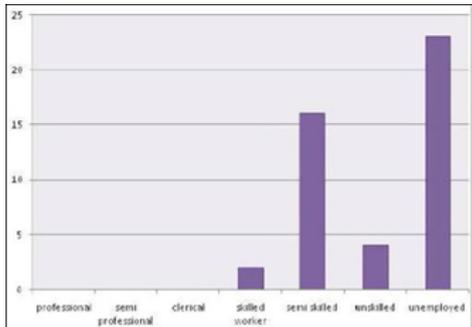
In our study we had seen twenty patients with right and left hip replacement.

Of twenty patients who had undergone total hip arthroplasty, thirteen patients had degenerative arthritis, five patients had fracture neck of femur and two patients had inflammatory arthritis (Ankylosing Spondylitis).

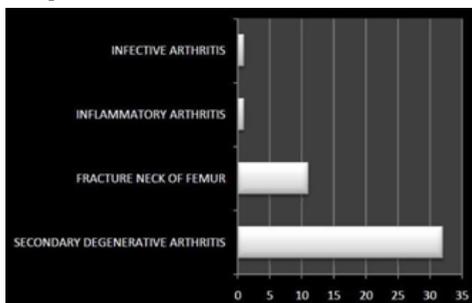


**Fig 4: Education status**

SECO Due to the importance of education in evaluating the socioeconomic status of the person, we found that majority of our patients had finished primary school and illiterate, In our study nineteen patients were illiterate, twenty four had attended primary school.



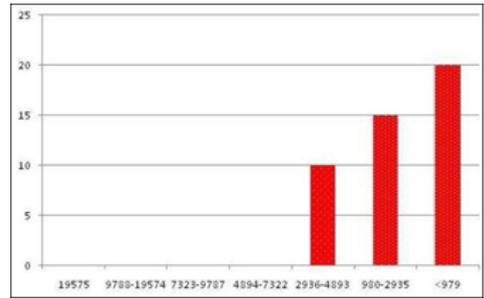
**Fig 5: Occupation**



**Fig 6: Diagnosis**

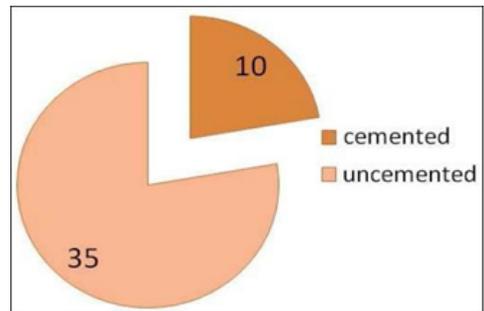
Also a detailed questioning of the patients employment was done,

majority of the patients employed either as semiskilled or unskilled workers contributing to about three fourth of our study population. Ten patients have become unemployed due to the severe disease had quit working, who were previously employed as unskilled labourers.

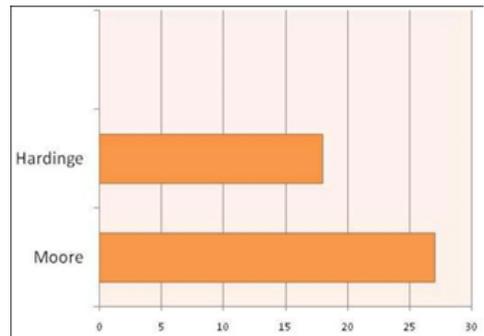


**Fig 8: Associated comorbid condition**

In our study group we had also evaluated the presence of other comorbid conditions we found that most patients had diabetes and systemic hypertension, half of which were found during the evaluation for surgery. Diabetes was the most common associated condition. Comorbid conditions are an important determinant influencing the outcome of socioeconomic status on total hip Arthroplasty.



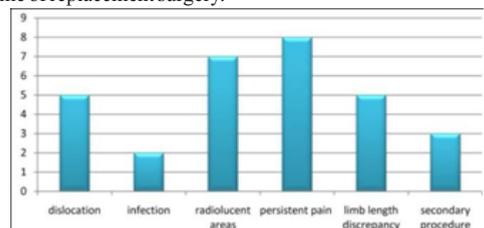
**Fig 9: Types based on cementation**



**Fig 10: Approach**

Of the 20 patients, thirteen patients had undergone total hip Arthroplasty by Moore approach and seven patients had total hip arthroplasty by Hardinge approach.

The patients were and in the period following it. The patients who had developed complications were reevaluated and appropriate treatment was started. The precise identification of complication is inappropriate treatment and explaining the prognosis to the patient. Complications arising following surgery can reduce the functional outcome of replacement surgery.



**Fig 11: Complications**

Of the twenty patients, three had dislocation with two dislocation occurred in the immediate post op period and three had later. Two patients had infection. three patients had radio lucent areas in the acetabular zone and femoral zones, five had persistent pain, five had limb length discrepancy and three patients had undergone secondary procedures for complications following THR.

In our study nearly 60% of our patients had suffered from complications. Dislocations were found in three. These patients were found to have a decreased satisfaction following surgery. Dislocations had decreased the overall functional outcome of the Arthroplasty. Two patients were not able to strictly adhere to the rehabilitation programme. Two patients had dislocation in the immediate post operative period, one. Another presentation was combined acetabular cup dislocation and infection, one patient with uncemented cup had dislocation had been revised with acetabular component, one had recurrent dislocation. Infection was another dreaded complication, in our study we observed two patients with infection. A patient had infection in the early post operative period and he was successfully treated with antibiotics and dressing. Another had infection leading to chronic state, cup dislocation, and persistent pain. Loosening was another set of specific complication encountered in total hip arthroplasty. Post operatively, three of our patients had developed radiolucent areas in the acetabular and femoral zones, and not compelling to the diagnosis of loosening and these patients were on regular follow up.

Five of our patients had post operative limb length discrepancy which leads to walking difficulties and preventing from returning to their job.

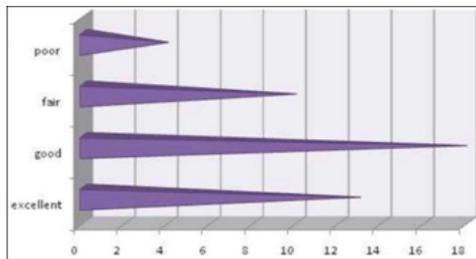


Fig 12: Functional outcomes

Functional outcome of the patients was evaluated using modified Harris hip score, thirteen had excellent outcome, eighteen patients had good and ten had fair outcome, four patients had poorer outcome.

**DISCUSSION**

Total hip replacement (THR) is a cost-effective elective procedure undertaken to relieve pain and improve quality of life for patients suffering from severe end-stage arthritis. Our study evaluates the functional outcome of THR in people from lower socioeconomic status, and to identify the factors contributing to the discrepancy in the functional outcome. The impact of lower socioeconomic status in total hip replacement is described from the west and the scarcity of the data in Indian studies is noteworthy to mention it.

Nelson [2] identified factors contributes to health care discrepancy revealed that more than 30% were attributed to socioeconomic status. Gomes concluded that the disparity in the functional outcome could be influenced by racial, ethnic and socioeconomic determinants. We defined our study people as per modified kuppusamy classification which includes occupation, income and education [3].

Nath *et al.* [4] states that the demands and need of our Indian patients is entirely different from what is described in literature. He also states that the Indian patients are having the greater pain tolerance than western patients which were related to the prolonged pre-operative hip disease, which were comparable to the results in our series where mean preoperative Harris hip score is 38 and mean visual analogue scale is 9.5. Agabiti *et al.* [5] concludes from his study that People with lower socioeconomic status experience a greater severity of hip symptoms and poorer preoperative hip status due to delayed presentations, which could be attributed to their socio economic status. In our study nearly 30 patients comes under the class of lower socioeconomic class, with nineteen patients are illiterate and twenty four patients had completed the primary school. Many of the Lower socio economic group people living in remote areas, where there is an access to standard health care facilities are difficult and distant, and high pain tolerance, subsequently leading to delayed presentations are one of the important contributing factors for the poorer outcome of total hip arthroplasty. Nearly 46% of our patients were illiterate in our

study which leads to lack of awareness of effective intervention for arthritis. This prevented them from getting an earlier expert consultation.

**CONCLUSION**

- Total hip arthroplasty is increasingly done for the patients from lower social economic status because of state funding and health insurance.
- There is a relative lack of evidence from Indian literature on the functional outcome of total hip arthroplasty in this sector of people.
- People with lower socioeconomic status had a greater severity of hip disease with mean Harris hip score of 38 and pre op visual analogue scale of 9.5.
- Lower income and lesser education contribute to poorer outcome and adverse complications after total hip arthroplasty.
- We had wide range of complications in 60% of our patients Persistent pain being the commonest one.
- Thirty one patients have obtained good to excellent functional outcome and about 30% of patients were not satisfied after surgery.
- By proper health education, thereby creating an awareness among them and providing improved access to health care for those with lower income and education, we can decrease the disparity in the outcome in this specific population.

Ex 1: 47yrs. old female working as construction labourer and an illiterate suffering from chronic arthritis left hip had undergone uncemented total hip arthroplasty.



Fig 13: Shows the fixed flexion deformity of left hip.



Fig 14: Pelvic radio graph shows the reduced joint space in the left hip.



Fig 15: Shows the Post-operative radio garph at one month followup



Fig 16: Shows patient had returned to her previous job