

Functional Outcome and Quality of Life Following Total Hip Replacement Surgery

Rabindra Regmi,¹ Dipak Shrestha,² Rohit Shrestha,² Sabik Raj Kayastha,² Jagadish Thapa,² Rajiv Sharma²

ABSTRACT

Background: Total hip replacement surgeries are popular treatment modality for degenerative and traumatic hip condition which provides high degree of patient satisfaction and are mainly described in literatures among patient residing in western world. However activities of daily living of people in hilly area of developing country are different from western country but there are paucity of literature describing outcome of these people.

Methods: Retrospective observational study was carried out in a university teaching hospital in Nepal. Patients residing in hilly region of Nepal who underwent total joint replacement of hip joint between 2017 to 2019 AD were included in the study. The functional outcome was measured using Harris Hip Score and the quality of life was assessed using SF-12 Patient Questionnaire preoperatively, 3 months, 6 months and 1 year follow up.

Results: More than two-thirds of the patients were male. The mean age group of patients was 45.71 years. The most common indication of surgery was avascular necrosis of femoral head. There was significant improvement in Harris Hip Score upto 6 months postoperatively. Quality of life including both physical and mental component of SF-12 improved significantly upto 6 months.

Conclusions: Total hip replacement surgery significantly improves functional outcome and quality of life of patients residing in hilly region of Nepal. However, long term follow up still is request to find out effect of joint replacement in activities of daily living in these group of people.

Keywords: Harris hip score; mental component summary scores; pain component summary scores; total hip replacement.

INTRODUCTION

Total hip replacement (THR) surgeries are common treatment modality for primary and secondary arthritic conditions of hip. Number of THR surgery are increasing and likely to increase worldwide including developing countries.¹⁻³ THR has been proven method to improve the quality of life with high degree of patient satisfaction along with improvement of pain.⁴⁻⁷ However literatures are mainly reported from western countries. There are paucity of studies related to functional outcome and quality of life of patients residing in hilly region of under developed and developing countries such as Nepal. Daily activities of people living in hilly region differ from people from flat land of the country. This study aims to compare functional outcome and quality of life of the

patients living in hilly region of Nepal before and after THR.

METHODS

All patients who had undergone THR surgeries in between January 2017 to December 2019 AD in Dhulikhel Hospital, Kathmandu University Hospital were included in the study after ethical clearance from institutional review committee (KUSMS-IRC No: 06/20). Demographic data, functional outcome and quality of life before THR and in subsequent follow up till 1 year were retrospectively collected from hospital record.

Functional outcome was measured using Harris Hip Score (HHS).⁸⁻¹⁰ HHS (Fig.1) comprised of four domain for pain,

Correspondence: Dr Rabindra Regmi, National Trauma Centre, National Academy of Medical Sciences, Mahankal, Kathmandu, Nepal. Email: hirabindra@hotmail.com, Phone: +9779841302548.

Author Affiliations

¹National Trauma Centre, National Academy of Medical Sciences, Mahankal, Kathmandu, Nepal, ²Dhulikhel Hospital, Kathmandu University Hospital, Dhulikhel, Kavre, Nepal.

function, absence of deformity and range of motion and maximum score was 100. Results were interpreted poor (score <70), fair (score 70-80), good (score 80-90) and excellent (score 90-100).

SF-12 Patient Questionnaire form was used to assess quality of life for both physical component summary score (PCS) and mental component summary score (MCS)¹¹⁻¹³ (Fig.2). The higher the scores indicate better quality of life. Demographic and pre-operative diagnostic data of patients including general information, diagnosis and treatment were extracted from the medical records of the patients.

Data was collected in a self-designed proforma. Pre-operative Harris Hip Score, Physical Component Summary and Mental Component Summary Score of SF-12 of patients, living in hilly area (610-4877 mt above sea level) of Nepal, were compared with 3 months, 6 months and 1 year follow up score. Harris hip score and SF-12 patient questionnaire were measured preoperatively, post-operatively at three months, six months and one year.

Patients having irregular follow up and residing in Flat land (Terai region), Kathmandu valley and Mountainous region were excluded from the study. Standard method of uncemented THR surgeries were followed using prosthesis of Zimmer/ Depuy Synthes/ Smith and Nephew.

Harris Hip Score		Hip ID:
		Study Hip: <input type="checkbox"/> Left <input type="checkbox"/> Right
		Examination Date (MM/DD/YY): / /
		Subject Initials: / /
		Medical Record Number:
Interval: _____		
Harris Hip Score		
Pain (check one)		
<input type="checkbox"/> None or ignores it (44) <input type="checkbox"/> Slight, occasional, no compromise in activities (40) <input type="checkbox"/> Mild pain, no effect on average activities, rarely moderate pain with unusual activity; may take aspirin (30) <input type="checkbox"/> Moderate Pain, tolerable but makes concession to pain. Some limitation of ordinary activity or work. May require occasional pain medication stronger than aspirin (20) <input type="checkbox"/> Marked pain, serious limitation of activities (10) <input type="checkbox"/> Totally disabled, crippled, pain in bed, bedridden (0)		
Stairs		
<input type="checkbox"/> Normally without using a railing (4) <input type="checkbox"/> Normally using a railing (2) <input type="checkbox"/> In any manner (1) <input type="checkbox"/> Unable to do stairs (0)		
Put on Shoes and Socks		
<input type="checkbox"/> With ease (4) <input type="checkbox"/> With difficulty (2) <input type="checkbox"/> Unable (0)		
Absence of Deformity (All yes = 4; Less than 4 = 0)		
Less than 30° fixed flexion contracture <input type="checkbox"/> Yes <input type="checkbox"/> No Less than 10° fixed abduction <input type="checkbox"/> Yes <input type="checkbox"/> No Less than 10° fixed internal rotation in extension <input type="checkbox"/> Yes <input type="checkbox"/> No Limb length discrepancy less than 3.2 cm <input type="checkbox"/> Yes <input type="checkbox"/> No		
Range of Motion (Indicate none all)		
Flexion ("40") _____ Abduction ("40") _____ Adduction ("40") _____ External Rotation ("40") _____ Internal Rotation ("40") _____		
Range of Motion Scale		
211° - 300° (5) 61° - 100 (2) 161° - 210° (4) 31° - 60° (1) 101° - 160° (3) 0° - 30° (0)		
Range of Motion Score _____		
Total Harris Hip Score _____		
Limp		
<input type="checkbox"/> None (11) <input type="checkbox"/> Slight (8) <input type="checkbox"/> Moderate (5) <input type="checkbox"/> Severe (0)		
Support		
<input type="checkbox"/> None (11) <input type="checkbox"/> Cane for long walks (7) <input type="checkbox"/> Cane most of time (5) <input type="checkbox"/> One crutch (3) <input type="checkbox"/> Two canes (2) <input type="checkbox"/> Two crutches or not able to walk (0)		
Distance Walked		
<input type="checkbox"/> Unlimited (11) <input type="checkbox"/> Six blocks (8) <input type="checkbox"/> Two or three blocks (5) <input type="checkbox"/> Indoors only (2) <input type="checkbox"/> Bed and chair only (0)		
Sitting		
<input type="checkbox"/> Comfortably in ordinary chair for one hour (5) <input type="checkbox"/> On a high chair for 30 minutes (3) <input type="checkbox"/> Unable to sit comfortably in any chair (0)		
Enter public transportation		
<input type="checkbox"/> Yes (1) <input type="checkbox"/> No (0)		

Figure 1. Harris Hip Score Questionnaire.

Scales	Items		Response categories
	No.	Contents (abridged)	
PCS-12	1	General health	Excellent/Very good/Good/Fair/Poor
	2	Moderate activities	Limited a lot/Limited a little/Not limited at all
	3	Climb several flights of stairs	Limited a lot/Limited a little/Not limited at all
	4	Accomplished less (physical)	Yes/No
	5	Limited in kind of work	Yes/No
MCS-12	6	Accomplished less (emotional)	Yes/No
	7	Did work less careful	Yes/No
	8	Pain - interference	Not at all/A little bit/Moderately/Quite a bit/Extremely
	9	Calm and peaceful	All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time
	10	Energy	All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time
	11	Downhearted and blue	All of the time/Most of the time/A good bit of the time/Some of the time/A little of the time/None of the time
	12	Social limitations - time	All of the time/Most of the time/Some of the time/A little of the time/None of the time

Figure 2. SF-12 Questionnaire.

The data were entered in Microsoft Excel and Statistical Package for Social Sciences (SPSS) for analysis. The results were calculated in frequencies, percentages and means. The statistical difference in the mean values for Harris Hip Score and SF-12 score were calculated using paired t -test. The level of significance was set at 5%.

RESULTS

A total of 32 patients from hilly region underwent THR surgeries during the study period. Twenty six patients with follow up in regular interval were included in the study. There were 18 male (69.2%) and 8 female patient (30.8%). The mean age of patients was 44.57 ± 2.23 years. Twelve patient had left sided THR surgery and 2 patients had bilateral THR surgery. The most common indication of surgery was avascular necrosis of femoral head (N=19), primary osteoarthritis of hip (N=7) and failed osteosynthesis for neck of femur fracture (N=2).

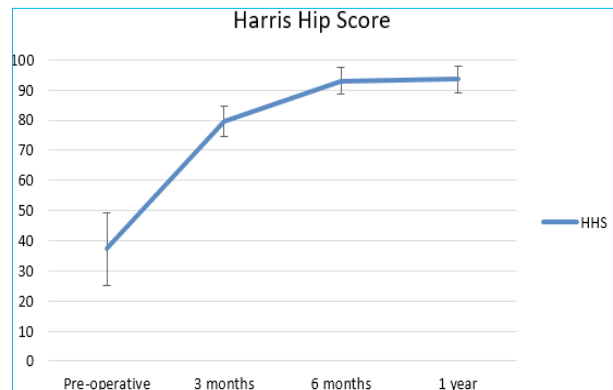


Figure 3. Harris Hip Score (Bars represent 95% confidential interval).

The mean preoperative HHS was 37.21± 12.05 which improved significantly at three month follow up (79.51±5.08, p<0.001). The mean six months follow up

score was 92.93 ± 4.43 which was significantly increased as compared to 3rd month mean HHS whereas mean increase in HHS score at 1 year follow up (93.59 ± 4.43) was not significant as compared to 6 months ($p=0.49$) (Figure 3).

The mean preoperative PCS was 27.46 ± 4.34 which improved significantly at three month follow up (43.26 ± 4.67 , $p < 0.001$). The mean six month follow up score was 54.40 ± 4.42 which was significantly increased as compared to 3rd month mean PCS whereas mean increase in PCS score at 1 yr follow up (55.61 ± 2.08) was not significant as compared to 6 months ($p=0.25$) (Figure 4).

The mean preoperative MCS was 23.40 ± 7.10 which improved significantly at three month follow up (55.02 ± 5.42 , $p < 0.001$). The mean six month follow up score was 59.17 ± 5.20 which was significantly increased as compared to 3rd month mean MCS whereas mean increase in MCS score at 1 yr follow up (61.02 ± 5.13) was not significant as compared to 6 months ($p=0.186$) (Figure 4).

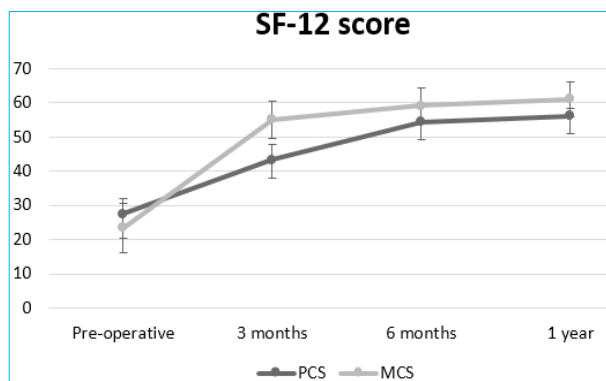


Figure 4. SF-12 score containing Physical component score (PCS) and Mental component score (MCS).

DISCUSSION

Our study suggest avascular necrosis of femoral head was the most common indication for hip replacement followed by primary osteoarthritis in our part of world, whereas other study suggest primary osteoarthritis as the most common indication for Hip replacement surgery, followed by Rheumatoid arthritis.¹⁴

The mean HHS at 3rd month, 6 month and 1 year significantly increased as compared to preoperative score. The improvement of mean HHS in between 3rd and 6 months follow up was significant and after then, though there was improvement but not statistically significant. Ng CY et.al. found maximum change in HHS at 6 months post operatively follow up which reached plateau at 18

months and maintained till 5 years follow.⁵ The current study also found highest improvement of mean HHS at 3rd month follow up which reached maximum at 6 months. Since then there was small improvement of HHS at 1 year follow up.

Quality-of-life is defined by World Health Organization as the self-perception of the patient within his or her own culture and values. It includes physical health, mental health, level of independence, social relations and environmental factors. Hip osteoarthritis is a disease that limits loss of range of motion of hip joint and causes pain. It affects both physical and mental health. Physical health is altered because of immobilization due to pain, and mental health secondary to psychological problems due to home dependent life.¹⁵ Thus the main aim for the treatment of these patients is to improve the quality-of-life and to make them return to daily activities as soon as possible.

SF-12 measures physical component and mental component of quality of life of the patients. There was statistically significant improvement of PCS up to 6 months post-operative period. Improvement of PCS continued until 1 year but not statistically significant. A study conducted by Fitzgerald JD et.al reported quality of life (SF-36) which showed decline in bodily pain and physical function at onemonths post-surgery but tends to increase after that.¹⁶ In current study physical function at one month post surgery was not evaluated but there was significant improvement of physical function at three months post-surgery which continued till six months which was similar to the findings reported by Ng CY et.al.

In our study MCS also improved significantly till 6 months and kept on improving at 1 year follow up but was not statistically significant. Unlike our findings, Ng CY et.al. found that mental health of the patients did not changed significantly post surgery.⁵ A long term study by Mariconda et.al, that is 16 years evaluation of quality of life and functionality following total hip replacement found that initial post surgical satisfaction of patients were high. However, on long term follow up, the quality of life and functionality of the patients will be impaired, but they still perform physically better than untreated advanced hip osteoarthritis.¹⁷ Similarly, in our study we found that initial post operative function and quality of life of the patients were improved significantly. However in long term, how these patient population will behave in terms of functionality and their quality of life is still yet to be seen.

Our reports of patients residing in hilly region of Nepal

and who had undergone THR surgeries have improvement in physical function and mental health component of SF-12 and HHS which is similar to the other studies. These report provides new insight regarding the time frame for improvement of both physical and mental component of quality of life and HHS. Considering these findings, it has important implications for patients and their families regarding expectation of physical and mental function post operatively. These findings will help surgeons to counsel patients and their families especially from hilly area of Nepal regarding the time frame for improvement of quality of life of patients.

The current study has few limitations. This is single centre study with small sample size and follow up of one year period only. The progress of HHS and physical function and mental function component of SF-12 after one year period hence could not be evaluated. However, functional outcome measurement by HHS and patient reporting outcome measurement by SF-12 of patients who had undergone THR surgeries and specifically residing in hilly topography of Nepal have provided important information about outcome after THR.

CONCLUSIONS

Total hip replacement surgery significantly improves functional outcome and quality of life of patients residing in hilly region of Nepal from base line till one year post operatively but the improvement in HHS and SF-12 score after six months post surgery was not significant. Further study with large number of patients with longer follow up is recommended to find out long term effect of THR.

CONFLICT OF INTEREST

None

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