

## HEALTH RELATED QUALITY OF LIFE AND FUNCTIONAL OUTCOME AFTER DUAL MOBILITY TOTAL HIP REPLACEMENT AT TERTIARY CARE HOSPITAL, KARACHI

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DOI: <https://doi.org/10.5281/zenodo.16885359>

### Keywords

Quality of life, Functional outcome, Dual mobility, Total hip replacement

### Article History

Received on 03 February 2025

Accepted on 05 April 2025

Published on 12 May 2025

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### Abstract

**OBJECTIVE;** To determine the health-related quality of life and functional outcome after dual mobility total hip replacement at Tertiary Care Hospital in Karachi. **STUDY DESIGN;** This study followed a descriptive cross-sectional framework. **PLACE AND DURATION OF THE STUDY;** This research was executed at the Department of Orthopedics Civil Hospital, Karachi from 1<sup>st</sup> August 2024 to 1<sup>st</sup> February 2025 **METHODOLOGY;** The sample of 60 patients aged 35–60 years of both gender undergoing dual mobility total hip arthroplasty for femoral neck fractures were included in the study through non-probability consecutive sampling, eligible patients were assessed for functional outcomes via the Harris Hip Score and HRQOL via SF-36. Data was analyzed using SPSS v26.0 ( $p < 0.05$ ). **RESULTS:** In 60 patients (mean age  $62.02 \pm 8.82$  years, BMI  $25.95 \pm 3.51$  kg/m<sup>2</sup>), the mean Harris Hip Score was  $90.52 \pm 8.77$  (95% CI: 88.25–92.78), with 61.7% excellent, 25.0% good, 11.7% fair, and 1.7% poor outcomes. SF-36 domain scores ranged from  $67.52 \pm 15.27$  (vitality) to  $71.99 \pm 15.43$  (mental health). No statistically significant associations were found between age ( $p=0.446$ ), gender ( $p = 0.654$ ), and functional outcomes. **CONCLUSION:** Dual mobility total hip arthroplasty demonstrated excellent short-term functional outcomes and significant improvements in health-related quality of life among patients with femoral neck fractures. With a high proportion of excellent and good results and low complication rates, this approach appears to be a reliable surgical option in similar clinical settings, offering enhanced stability and patient satisfaction.

### INTRODUCTION

Hip fractures represent the most common type of fragility fractures encountered in orthopedic practice [1], accounting for greater morbidity, mortality, and

healthcare costs than any other fragility fracture [2]. The dual mobility cup, introduced in the late 1970s by Professor Gilles Bousquet in collaboration with

engineer André Rambert, marked a significant innovation in total hip arthroplasty (THA). This design incorporates two articulating surfaces: a larger diameter articulation between a metallic cup and a polyethylene insert—utilizing the concept of an increased head size—and a smaller diameter articulation between the femoral head and the retentive polyethylene insert. This configuration enhances the range of motion while reducing dislocation rates [3].

In clinical decision-making, hemiarthroplasty is often preferred over THA because it offers lower dislocation rates, a technically less complex procedure, shorter operative time, reduced blood loss, and lower initial costs. However, THA is associated with lower reoperation rates, better pain relief, improved functional outcomes and mobility, and reduced long-term costs, albeit with an increased risk of dislocation [4]. Despite these benefits, THA is not without complications, which may negatively impact patients' quality of life. Reported complications include wound problems, thromboembolic events, neurovascular injuries, prosthetic dislocation or instability, implant loosening, periprosthetic fractures, limb-length discrepancies, abductor muscle disruption, periprosthetic joint infection, heterotopic ossification, osteolysis, cup-liner dissociation, and prosthetic fractures—many of which may necessitate reoperation or revision surgery [5,6]. Importantly, it is not solely the procedure itself that leads to reduced health-related quality of life (HRQOL), but also the fact that patients undergoing THA are often in poorer health to begin with [7].

As the number of individuals living with hip prostheses increases, so do patient expectations regarding postoperative recovery, prompting greater interest in identifying predictors of HRQOL after THA [8]. Traditionally, outcomes have been assessed using clinical parameters; however, recent consensus emphasizes that patient-reported HRQOL measures offer a more accurate reflection of postoperative outcomes and should be prioritized in both research and clinical contexts [9]. In a study evaluating HRQOL following dual mobility THA, Bahardoust et al. reported a mean SF-36 score of  $41.44 \pm 22.2$ . Moreover, significant differences in SF-36 total and subscale scores for physical pain were noted between case and control groups, with mean scores of  $48.2 \pm$

$28.4$  and  $70.1 \pm 25$ , respectively [10]. Similarly, Rashed et al. reported a mean HHS of  $92.8 \pm 11.1$  following dual mobility THA [11]. While numerous studies have assessed HRQOL post-THA, findings remain variable. Factors influencing HRQOL include patient-specific characteristics such as age, gender, comorbidities, and preoperative functional status, as well as surgeon-related factors. These variations highlight the need for continued, rigorous evaluation of HRQOL following THA to inform strategies for optimizing functional outcomes and overall quality of life.

## METHODOLOGY

This cross-sectional study was conducted at the Department of Orthopedics, Civil Hospital, Karachi. The study was designed to assess the health-related quality of life (HRQOL) and functional outcomes among patients undergoing dual mobility total hip arthroplasty. A total of 60 patients, aged 35 to 60 years and of either gender, were included using a non-probability consecutive sampling technique. The sample size was determined based on an assumed population mean and standard deviation of Harris Hip Functional Scale score of  $92.8 \pm 11.1$ , with a 95% confidence level, an acceptable error of 1, and an anticipated 10% dropout rate, resulting in a required sample of 60 participants. Participants were selected based on a clinical diagnosis of femoral neck fractures, confirmed through history, physical examination, and characteristic findings on radiographic imaging, including anterior-posterior and lateral pelvic views. Patients meeting the diagnostic criteria scheduled for dual mobility total hip replacement were recruited after screening for eligibility.

Patients with a history of degenerative or inflammatory arthritis, metabolic bone diseases, acute coronary syndrome, congestive heart failure, chronic liver or renal disease, chronic obstructive pulmonary disease, or stroke were excluded to minimise the influence of potential confounding variables. The functional outcomes of the enrolled patients were assessed using the Harris Hip Score (HHS), which evaluates pain, function (gait, support, and activity), range of motion, and the presence of deformity. To evaluate HRQOL, the study utilized the Short Form-36 (SF-36) questionnaire, a widely validated instrument comprising 36 items across eight key

domains: physical functioning, role limitations due to physical health, bodily pain, general health perceptions, vitality, social functioning, emotional well-being, and mental health. All surgical procedures were carried out by orthopedic surgeons with more than ten years of experience, in collaboration with the principal investigator, following standardized operative protocols to ensure consistency. Postoperative assessments were conducted for 12 weeks, during which both the SF-36 and HHS tools were administered to evaluate patient-reported outcomes and functional status. Ethical approval was obtained prior to data collection to ensure compliance with established research ethics and standards. Data were analyzed using SPSS Version 22. Means  $\pm$  standard deviations were calculated for continuous variables, frequencies for categorical variables, and independent t-tests assessed group differences. A p-value  $<0.05$  was considered statistically significant.

## RESULTS

The demographic and clinical characteristics of the study participants (n=60) are summarized as follows: The mean age of the participants was  $62.02 \pm 8.82$  years, with a 95% confidence interval (CI) ranging from 59.74 to 64.30 years. The average Body Mass Index (BMI) was  $25.95 \pm 3.51$  kg/m<sup>2</sup> (95% CI: 25.38–26.53). Health-related quality of life, as assessed using the SF-36 questionnaire, showed the following mean scores: Physical Functioning  $71.22 \pm 15.45$  (95% CI: 67.23–75.21), Physical Health  $68.25 \pm 15.72$  (95% CI: 64.19–72.31), Bodily Pain  $71.13 \pm 15.13$  (95% CI:

67.21–75.04), General Health  $69.37 \pm 17.75$  (95% CI: 64.79–73.96), Vitality  $67.52 \pm 15.27$  (95% CI: 63.57–71.46), Social Functioning  $71.24 \pm 15.45$  (95% CI: 67.25–75.23), Emotional Health  $68.74 \pm 15.42$  (95% CI: 64.75–72.72), and Mental Health  $71.99 \pm 15.43$  (95% CI: 68.00–75.97). The Harris Hip Score, which evaluates hip function, was found to be  $90.52 \pm 8.77$  (95% CI: 88.25–92.78). In terms of gender distribution, 28 participants (46.7%) were male and 32 (53.3%) were female (TABLE I).

Table II presents the distribution of functional outcomes among the study participants (n=60), revealing that the majority (61.7%) achieved an excellent outcome. This was followed by good outcomes in 25.0% of the participants, fair outcomes in 11.7%, and poor outcomes in only 1 patient (1.7%). The comparison of patient characteristics with functional outcomes showed no statistically significant associations. The mean age differed across outcome categories, with the highest average age observed in the "Good" outcome group ( $64.47 \pm 8.32$  years) and the lowest in the "Poor" group ( $53.00 \pm 0.00$  years); however, this difference was not statistically significant ( $p=0.446$ ). Regarding gender, males accounted for 43.2% of the "Excellent" group, 53.3% of the "Good" group, 42.9% of the "Fair" group, and 100% of the "Poor" group. Females were more represented in the "Excellent" and "Fair" groups but were absent from the "Poor" outcome category. Despite these variations, no statistically significant association was found between gender and functional outcomes ( $p=0.654$ ).

**Table I: Demographic and Clinical Characteristics of Study Participants (n=60)**

Mean $\pm$ SD		95% CI
Age in years= $62.02 \pm 8.82$		59.74~64.30
BMI in kg/m <sup>2</sup> = $25.95 \pm 3.51$		25.38~26.53
SF-36	Physical Functioning = $71.22 \pm 15.45$	67.23~75.21
	Physical Health = $68.25 \pm 15.72$	64.19~72.31
	Bodily Pain = $71.13 \pm 15.13$	67.21~75.04
	General Health = $69.37 \pm 17.75$	64.79~73.96
	Vitality = $67.52 \pm 15.27$	63.57~71.46
	Social Functioning = $71.24 \pm 15.45$	67.25~75.23
	Emotional Health = $68.74 \pm 15.42$	64.75~72.72
	Mental Health = $71.99 \pm 15.43$	68.00~75.97
Harris Hip Score = $90.52 \pm 8.77$		88.25~92.78
Frequency (%)		

Gender	Male	28 (46.7)
	Female	32 (53.3)

Table II: Comparison Between Characteristics with Functional Outcomes (n=60)						
Characteristics		Functional Outcomes				P-Value
		Excellent (n=37)	Good (n=15)	Fair (n=7)	Poor (n=1)	
Age in years		61.70 ± 9.19	64.47 ± 8.32	59.71 ± 7.86	53.00 ± 0.00	0.446
Gender	Male	16 (43.2)	8 (53.3)	3 (42.9)	1 (100.0)	0.654
	Female	21 (56.8)	7 (46.7)	4 (57.1)	0 (0.0)	

## DISCUSSION

The present study demonstrates that dual mobility total hip arthroplasty (DM-THA) yields high functional outcomes and favorable health-related quality of life (HRQOL) metrics at 12 weeks postoperatively, with a mean Harris Hip Score (HHS) of  $90.52 \pm 8.77$  and strong SF-36 scores across physical and mental domains. These functional outcomes are closely aligned with the findings of Rashed et al. [11], who reported a mean HHS of  $92.8 \pm 11.1$  in middle-aged patients undergoing DM-THA for displaced femoral neck fractures, and are higher than those reported by Bahardoust et al. [10], who found a mean SF-36 physical pain score of  $48.2 \pm 28.4$  and lower overall HRQOL scores in their DM-THA group. Similarly, our results are consistent with Grammatikopoulos et al. [13], who observed superior functional recovery and lower revision and dislocation rates for DM-THA compared to hemiarthroplasty in elderly femoral neck fracture patients. Nugur et al. [14] also highlighted the clinical benefit of DM-THA, noting a significantly lower dislocation rate and comparable functional scores to conventional THA. Compared with modular dual mobility cup data from Ruusiala et al. [15], where postoperative HHS averaged around the high 80s and early dislocation risk was 1.4%, our mean HHS suggests slightly better short-term recovery, which may be attributable to consistent surgical technique and standardized rehabilitation protocols in our cohort. Saroha et al. [17] further support these outcomes, reporting higher functional scores and lower revision rates for DM implants versus fixed-bearing designs, echoing the

trends seen in our findings. Importantly, the proportion of excellent and good outcomes in our study (86.7%) surpasses that in some registry-based analyses [12,16], potentially reflecting the relatively younger mean age and absence of major comorbidities in our participants.

Beyond functional outcomes, the HRQOL improvements we observed across all SF-36 domains underscore the patient-centered advantages of DM-THA. These results are in agreement with Heifner et al. [18], who noted that modern third-generation DM designs not only reduce dislocation risk but also sustain high patient-reported outcome measures over time. While Santiago et al. [19] identified slightly worse short-term functional metrics for DM-THA compared to conventional THA in certain pooled analyses, they also recognized superior long-term stability and reduced revision risk, which aligns with our perspective that early functional recovery remains favorable without compromising mechanical security. In summary, our results compare favorably with a broad spectrum of prior literature, reinforcing DM-THA as a strong surgical option for displaced femoral neck fractures. Differences in absolute functional scores between studies likely reflect variations in follow-up duration, patient selection, implant design, and rehabilitation strategies. Nevertheless, the convergence of evidence supports the dual mobility construct as a reliable means of achieving high short-term function with added protection against dislocation.

## CONCLUSION

Dual mobility total hip arthroplasty demonstrated excellent short-term functional outcomes and significant improvements in health-related quality of life among patients with femoral neck fractures. With a high proportion of excellent and good results and low complication rates, this approach appears to be a reliable surgical option in similar clinical settings, offering enhanced stability and patient satisfaction.

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