

# Age-related Outcome of Primary Total Hip Replacement in Baghdad Medical City Complex, Baghdad, Iraq

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## ABSTRACT

**Background:** Although total hip arthroplasty is an effective procedure, not all patients gain the same degree of improvement; many factors play a role in the outcome; one of the suggested factor was age.

**Methods:** A retrospective cohort study of 78 cases underwent primary total hip arthroplasty where age is the main factor for differentiation. Those patients were divided into three equal groups (young, middle, and old). The patients were evaluated for functional outcome depending on harris hip score (HHS) and complications rate through short-term follow-up (6–12 months) compared to these data with other groups.

**Results:** Male was 54% of total patient, the patients underwent surgery for a different reason but mainly due to trauma, or it is complications, the comparison shows that less time of hospitalization in the young age group with statistically significant lower change in HHS in the same age group, but the complications rate was statistically insignificant among three group.

**Conclusion:** Younger patients have lower HHS changes than older age, where older patients had prolonged hospital admission.

**Keywords:** Complications, Harris hip score, Middle age, Old age, Outcome, Total hip arthroplasty, Young age.

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## INTRODUCTION

### Entire Hip Replacement

Entire hip replacement (THR) has shown to be actual interference to improve pain and recovery movement in patients with the finale-phase hip illness. The corner of this skill is the insertion of a metal stem into the femur and fixed by a ball that enunciates in contradiction of a cup introduced into the acetabulum; remnants are unaffected since its introduction in monotonous medical exercise the 1960s.<sup>1</sup> However, not all patients gain the same degree of improvement, and sometimes, the reasons for this are not clear. Many investigators have assessed predictors of outcome after a hip surgery.<sup>2-5</sup> One of the factors that have been supposed to affect outcome after total hip arthroplasty (THA) is the patient's age.

The aging process changes the musculoskeletal system. At the muscular level, the changes lead to decrease and form defeat. This is a usual procedure, but an inactive way of life can quicken it. In addition, to decrease the number and size of muscle fibers and slow the body's metabolic rate.<sup>3</sup> On Bones,

a decrease in bone mineral, which leads to less in density and easily broken this lead to osteoporosis and causes bone fracture (hipbone), especially older female and male and vertebrae fracture, subsequent in a "dowager's hump. Cartilage function is offering to cushion between bones. Decrease in water cause stress can occur in it lead to degenerate and arthritis formation. While ligaments, connective tissues convert to less elasticity and decrease in flexibility.<sup>6</sup> In addition to that, increasing age is associated with increased morbidity and chronic disease. In this study, we try to determine the relationship between age only as solitary factors and the outcome of total hip arthroplasty in our population.

### PATIENTS AND METHODS

Retrospective cohort study of cases underwent total hip arthroplasty in Baghdad medical city complex (Ghazi AL Hariri for specialized surgery and nursing home hospital), and the data was collected during the period from October 2015-2018. More than 300 THA procedures were performed by orthopedic surgeons with different levels of experience

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from 2011–16; from the above number, only 90 patients were involved in the study, who owned the selected criteria. Some essential data were missed from twelve patients; therefore, the final number was 78 patients.

**Patients Classification**

These patients were divided into three equal groups depending on the age at the time of surgery; each group contains 26 patients as follow:

- Group I (young age group= < 40 years).
- Group II (middle age group 41–60 years).
- Group III old age group (> 60-years-old).<sup>7</sup>

**Inclusion and Exclusion Criteria**

- Inclusion criteria were patients who underwent primary total hip replacement surgery in our center.
- Cases that carry exclusion criteria were:
  1. Revision surgery.
  2. The presence of comorbid conditions like diabetes mellitus, ischaemic heart disease, pulmonary disease, previous thromboembolism phenomena, and hypertension

**Pre-surgery Data**

Patients’ clinical assessment included previous detailed history and examination with recording the patient’s data, including sex, age at time of surgery, and limb length.

Harris’s hip score was also estimated preoperatively. Briefly, this scoring system is a method to measure the degree of pain (44 points), function (47 points), range of movement (5 points), and deformity (4 points)<sup>8</sup> with a total score is 100.

*1. Surgical Procedures Data*

Procedures were performed through the posterior approach when a patient in lateral position was under spinal or general anesthesia according to anesthetic preference. Surgical technique, intraoperative finding, and blood transfusion, if needed, were both reviewed.

Hospital stay was recorded where post-operative physiotherapy was trailed according to surgeon preference, hospital protocol, and finally depending on intraoperative findings.

*3. Post-surgery Functional Data*

Collection of Follow up data for the case did 6 to 12 months after the operation; participants were contacted either during a follow-up visit or by phone. Evaluation includes the presence of complications during this period and functional score.

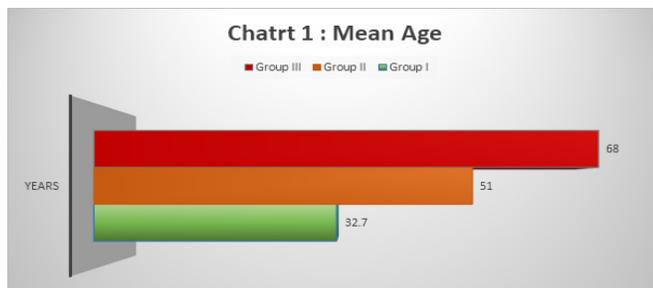


Chart 1 : Mean age

**Outcome Measure**

Two-measures assessed functional outcome after surgery:

- I. The first one was the complication rate.
- II. Second assessment parameter by using the Harris’ hip score. Harris hip score of 80 points or more was considered good, whereas HHS of less than 80 points was considered fair - poor, but the best assessment depended on post-operative increase in HHS of > 20 points with radiographically stable implant and no additional femoral reconstruction.

Our study depends mainly on the difference between preoperative and post-operative scores because it gives us a more sound assessment.<sup>9</sup>

**Statistical Analysis**

Mean ± standard deviation and qualitative variables are numbers, and percentages were evaluated in differences among groups by using Student’s t-test for quantitative data. While analyzing qualitative data by Chi-square test. A p-value of <0.05 was considered statistically significant, all data analyzed by statistical package for the social sciences (SPSS) 22.

**RESULT**

The patients were divided into 3 groups depending on the age where the mean age for group I (young age) was 32.7 years, group II (middle age) was 51 years, and group III (old age) was 68 years, as shown in Chart 1.

Most of the patients involved in the study were male, about 54% of total patients, but there is some variation inside the group regarding gender, where there is a male predominance in middle and old age group while young age group show female was slightly higher percent as Chart 2 show.

While charts 3 and 4 show the percent of each group to a total number of patient for males and females, respectively.

Many reasons for performing THA in our study, the frequency of pathology to be a reason for such surgery differed from group to another where avascular necrosis was the most common cause for performing the procedure in young patients followed by trauma and this trauma due to either acetabular fracture or non-union fracture neck of femur.

While in the middle age group, the most common cause was trauma, primarily fracture neck of femur followed by avascular necrosis. In older patients, trauma is still the leading cause for

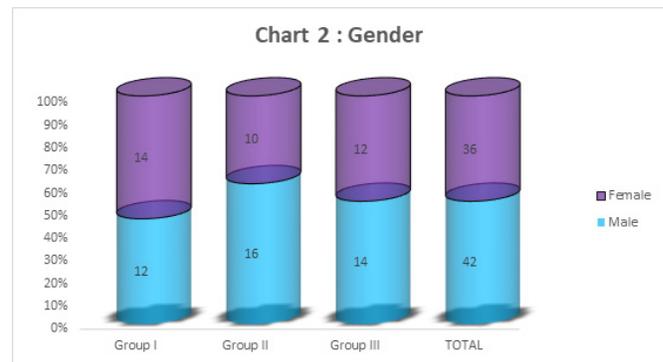


Chart 2 : Gender

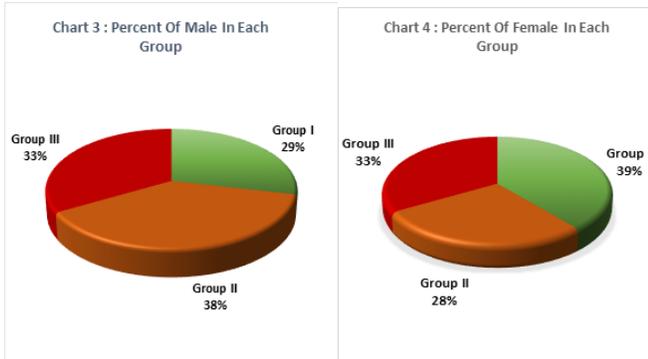


Chart 3 : Percent of male in each group

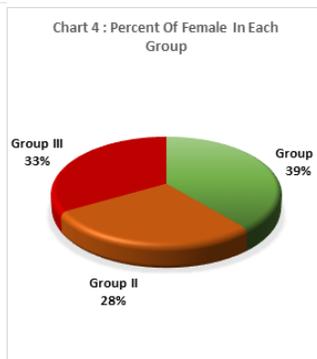


Chart 4 : Percent of female in each group

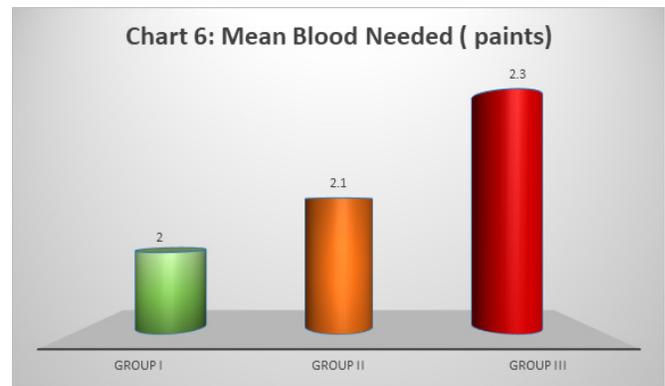


Chart 6: Mean blood needed (paints)

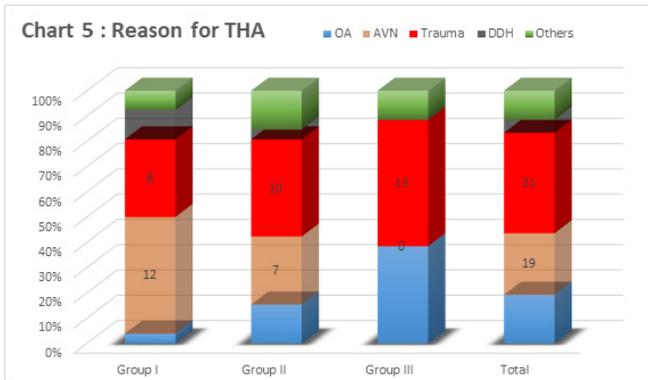


Chart 5 : Reason for THA

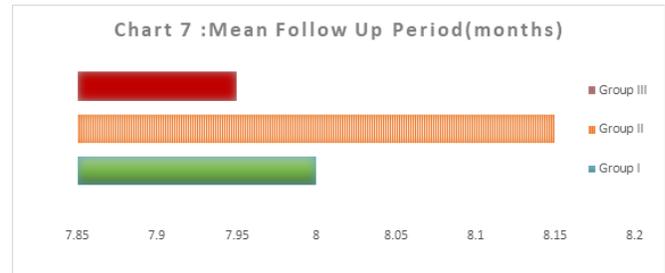


Chart 7 :Mean follow up period (months)

performing THA in the form of fracture neck of femur, and secondly, osteoarthritis was the problem; therefore, in a total number of patients, trauma was the most common reason for performing surgery followed by avascular necrosis in Chart 5.

All patients needed a blood transfusion during surgery in different quantities, but the mean shows that old age needs slightly more blood than other groups, as shown in Chart 6.

The statistical analysis show insignificant differences in the requirement of blood transfusion among age groups with  $p\text{-value} = 0.507$

The patient followed for period range from 6–12 months with equal mean for follow-up period, which was about 8 months for all three groups, as in Chart 7.

Hospital stay was found to be less in the young age group with mean of 4 days but more in both other groups with mean of 5 days.

Complications could occur after surgery, and in our sample, we found, one case died during fellow up period who was old age, 3 cases of dislocation occurred one in each group, thromboembolism phenomena in the form of deep vein thrombosis (DVT) has noticed in 2 cases one was middle age, and another was old age.

One case had an intraoperative fracture in an old age person, and one case complained of nerve injury which was a young patient, no one had vascular injury or Loosening and osteolysis, as Table 1 shows.

Another complication like infection had occurred in two cases one of them was middle age, and the other was old age;

**Table 1: Complications**

Complications	Group I	Group II	Group III	P-Value
Mortality	0	0	1	0.373
Dislocation	1	1	1	1
Thromboembolism	0	1	1	0.609
Vascular injury	0	0	0	0
Fracture	0	0	1	0.132
Nerve injury	1	0	0	0
Loosening and osteolysis	0	0	0	0
Hospital stay (Mean days)	4	5	5	0.045*

**Table 2**

Complications	Group I		Group II		Group III		P-Value
	No.	%	No.	%	No.	%	
Infection	0	0%	1	3.8%	1	3.8%	0.609
LLD	4	15%	5	19%	5	19%	0.309
Heterotropic Ossification	2	7.7%	2	7.7%	1	3.8%	0.358
Revision	0	0%	0	0%	2	7.7%	0.132

heterotropic ossification was observed in 5 cases, 2 of them were young and the same number was middle age, while limb length discrepancy was observed in 15% of young patients and 19% in both middle and old age patients.

Finally, two cases were needed revision surgery, and both cases were old age patients, as shown in Table 2.

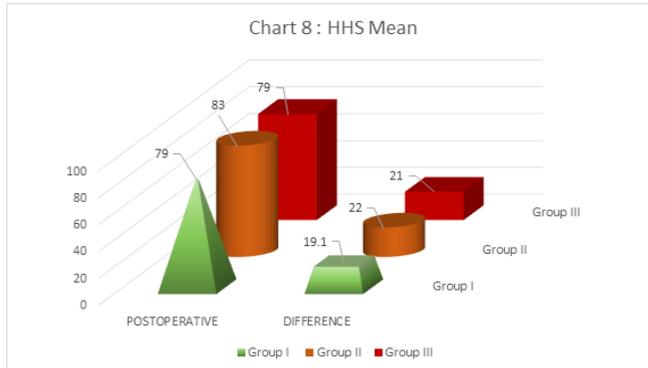
Regarding the second part of the assessment, we notice that Harris's mean, post-operative mean was slightly higher in the middle age group than the other two groups. In addition

**Table 3:** Percentage of change

Group	N	Mean	Std. deviation	95% Confidence interval for mean			
				Lower bound	Upper bound	Minimum	Maximum
<=40	26	31.9298	3.96427	30.3286	33.5310	25.40	39.66
41-60	26	36.5863*	4.44984	34.7890	38.3837	25.00	47.17
>60	26	37.2657*	5.76231	34.9383	39.5932	25.42	49.06

\* Significantly different from <=40, p = 0.001

There is no significant difference between 40–60 and >60 years (p > 0.05).

**Chart 8 :** HHS Mean

to that, the increment in the score of the previously mentioned group was also higher than other groups, where the young age group record the lowest increment of HHS as per Chart 8.

This change was better evaluated by calculation percentage of change (Table 3).

## DISCUSSION

Total hip arthroplasty is a magic solution with excellent outcome in well-selected patients for different end stage hip pathologies; this procedure was applied for patients without age limit from as early as 17 years old adolescent patients<sup>10</sup> to older age patient with more than 100 years old.<sup>11</sup> With increasing age, multiple comorbidities appear late in life. These factors may play a role in the outcome of surgery, so it is important to clarify, this effect is related to age alone or due to other associated comorbidities. The patient's age was divided into three groups depending on the age where each period of life with specific physiological and biomechanical properties lead to differences in response to demand and forces around the hip joint that is why we choose different age group.<sup>12</sup> The study results show a statistical insignificance difference in the complication rate among three age groups except in elderly patients who have prolonged hospital admission compared with middle and young-age people. Jones CA *et al.*<sup>13</sup> concluded that the outcome of total hip arthroplasty is not affected by age, where there is no difference regarding pain, function, improvement in life quality, and comparisons of both complications and comorbidities for different age groups at 6 months follow up duration. Ethgen O *et al.*<sup>14</sup> highlighted that age is not a limiting factor for total joint replacement to improve the quality of life. The study also shows that the best result of THA in males with poor preoperative life quality, but

the modest improvement was noticed when comorbidities were present that raise a concern about the role of these comorbidities in a poor outcome. Lukman *et al.*<sup>15</sup> describe that increasing age of the patient at the time of total hip replacement associated with increased risk of mortality as a major predictor, the same finding was observed by Nelson *et al.*<sup>16</sup> in addition to raising the risk of infection and short-term complications up to 3 months postoperatively. The previous study shows that the strongest predictor of the result was complicated diabetes. The association between age and mortality rate also noticed by other authors, Pasqualina L *et al.*,<sup>17</sup> in his systemic review concluded that old age males had a high mortality rate and higher revision rate. Nancy L *et al.*<sup>18</sup> found in a systemic review that elderly patients associated with higher complications rate with prolonged hospitalization and poor functional outcome. Although the study shows lower satisfaction in young patients with the poor long-term outcome for those age groups and more problems with acetabular component. Two other studies show that elderly patients underwent total joint replacement had a higher complication rate postoperatively and prolonged recovery time needed, and higher mortality rate.<sup>19,20</sup> While Fang *et al.*<sup>21</sup> concluded that older patients were more likely to have a longer hospital stay with an increased ICU admission rate, in addition to more post-operative complications. Our study result also shows a significantly lower Harris Hip Score in the younger age group compared with middle and older age person, but the last two groups did not have differences in between. Young patients had a higher expectation of surgery, quality of life, and post-operative satisfaction,<sup>22</sup> would have a lower functional score, although those young patients regularly engage in moderate activities and low impact intermittently like bicycling. As pain is the most important part of HHS, Paolo Ferrata *et al.*<sup>23</sup> conclude in a mini-review that better pain outcome in the elderly due to limited sport-related activities and hence physical demand, good pain tolerance, and psychological factors like the decreased incidence of depression and anxiety. This relation between age and pain scores not always constant where some authors<sup>17</sup> describe the similar impact of different age groups on the pain score. Lukman Shebubakar *et al.*<sup>15</sup> shows that the age at the time of surgery was a significant factor determining HHS. Nancy L. *et al.*<sup>18</sup> states that younger age groups and extreme elderly over 75 years had poor functional outcomes and longevity of prosthesis life. Other factors partially affected age-related outcomes like post-operative expectation, comorbidities, type

of pathology, and finally, level of activities. George H Smith *et al.*<sup>24</sup> has conclude that outcome improvement of THA in young patients was not as great, especially for long-term and prosthesis survival, although short-term outcomes show good results due to high levels of activities that lead to accelerated wear. Many authors<sup>25-26</sup> show that advanced age more than 70 years old is associated with good results and better functional outcomes from those younger than this age, while others<sup>12</sup> concluded that all age groups had the same patient-related functional outcome. In a systemic review, Nancy *et al.*<sup>18</sup> described that the young patient age group associated with major complications even when they had high HHS at a short-term follow-up period shows the radiological finding of radiolucent line or prosthesis migration so-called problem hip that needs revision surgery. They conclude that HHS may be falsely high for that group of patients.

## CONCLUSION

Younger patients have a lower HHS change than older patients associated with prolonged hospital admission.

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