

Quality of Life Following Hemiarthroplasty in the Elderly

*Muhammad Musa Chiroma¹, Muhammed Nuhu Salihu², Francis Olusoji Awonusi³,
Aminatu Ayaba kwaku⁴, Ibrahim Usman Mustapha⁵

¹ Neurospine Unit, National Orthopedic Hospital, Dala Kano; ² Arthroplasty Unit National Orthopedic Hospital, Dala Kano; ³ Alliance Hospital, Abuja; ⁴ Community Medicine Department, Aminu Kano Teaching Hospital, Kano; ⁵ Surgery Department, Bayero University and Aminu Kano Teaching Hospital, Kano, Nigeria

Abstract

Background: Fracture neck of femur in the elderly population, are common and often a devastating condition leading to morbidity and sometimes even mortality if not treated or appropriately addressed. The optimal treatment has been a subject of debate. Arthroplasty or surgical fixation gives good outcome among others. Health related quality of life is a useful tool in assessing the outcome of hemiarthroplasty. This study compared the quality of life of elderly patient before and after hemiarthroplasty using EQ-5D and EQ-VAS health questionnaire as a tool.

Methodology: This was a prospective descriptive study done over 18 months on elderly people with fracture neck of femur who had hemiarthroplasty at the national orthopedic hospital, Dala, Kano, Nigeria. This study was designed to measure the outcome of hemiarthroplasty using health related quality of life with EQ-5D and EQ-VAS health questionnaire as a tool.

Result: There was a significant change in the quality of life indices observed during the pre-operative period and six months after surgery ($P < 0.05$). This significant change was seen using both the EQ-5D descriptive system and the EQ-VAS.

Conclusion: Hemiarthroplasty improves the health related quality of life among elderly patients with fracture neck of femur. The EQ-5D and EQ-VAS health questionnaire are a valuable tool in assessing the health related Qol following hemiarthroplasty

Keywords: Hemiarthroplasty; Quality of Life; Fracture Neck of Femur.

Introduction

Elderly people suffer fractures from trivial trauma especially that of the hip which can be either femoral neck fractures or intertrochanteric/pertrochanteric fractures^[1, 2] The risk factors predisposing them to this fracture are high incidence of comorbidities like diabetes, renal disease, hyperparathyroidism, hypertension etc.^[3] Patients with stroke have been shown to have up to a 4-fold increased risk of hip fracture because of their high incidence of falls and hemiosteoporosis in the paretic.^[3, 4] These conditions causes some form of osteoporosis and hence bone weakness which makes it easy for trivial trauma to break them.^[3] It is also know that elderly people have

poor balance and poor muscle coordination, hence, the fall easily and developing this fractures.^[3, 4] The incidence of femoral neck fractures in the elderly is about 50% of all hip fractures and this is rising due to increase in the geriatric population and life expectancy.^[5] Worldwide an estimated 1.26 million hip fractures occurred in adults in 1990, with predictions of numbers rising to between 7.3 and 21.3 million by the year 2050 majority of which occur in

Corresponding Author: *Mustapha Ibrahim Usman,
Surgery department Bayero University Kano and
Aminu Kano Teaching Hospital.
mustyibro90@gmail.com

Access this article online

Quick Response Code:



Website:

www.nigerianmedjournal.org

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

How to cite this article: ChiromaMM, SalihuMN, AwonusiFO, kwakuAA, MustaphaIU. Quality Of Life Following Hemiarthroplasty in the Elderly. Niger Med J 2021;62(5): 243-248

the elderly.^[3,4] In Nigeria, report of 65.5%, 70% and 89.% in Lagos, Ibadan and Enugu respectively by different authors.^[6,7,8] In America the incidence of femoral fracture was found to be higher among whites compared with other races like blacks, Hispanic and Asians.^[3] An estimate of about fourteen billion dollars is spent each year to take care of one million affected elderly persons with only about a quarter regaining their pre fracture function. Female are more affected than males.^[3] In Nigeria, the male/female ratio of elderly with fracture neck of femur was documented as 1: 1.3 and 2.6:1 by Ogunlade and Eyichukwu respectively.^[7,8]

Clinical evaluation of patients with fracture neck femur may reveal a history of trivial fall, pain in the hip, inability to bear weight, shortening of the limb, external rotation and tenderness of the hip.^[9,10,11] History of comorbidities, blindness and stroke may also be found. Plain radiograph can clinch the diagnosis in majority of the cases.^[9,11] However, other imaging modalities like CT scan, MRI or bone scan may be employed in making diagnosis as well as classifying the fracture.^[9-13]

Treatment of femoral neck fractures can non-operative or operative. The non-operative treatment is reserved for those who cannot withstand surgery. The operative options are either fixation or hip replacement (partial or total). Fixation options include cannulated screws, dynamic hip screw, nails or vulgarizing osteotomy.^[9-13]

The goal of treating all patients with hip fractures is to return them back to their pre-injury level of activities as much as possible. In Nigeria, Various work have been conducted on hip fractures in the elderly, however, we have not seen any study addressing the quality of lives of these patient after the surgical procedures be it internal fixation or replacement arthroplasty. The focus of this work is to evaluate the quality of life (QOL) of elderly patients before and after hemiarthroplasty for femoral neck fracture using the EQ-5D questionnaire EQ-VAS forms assessment tools.^[14,15] Although this has been done in other countries especially the West. Hence, we intend to document our experience with quality of life of this group of patient following hemiarthroplasty.

Methodology

This was a cross-sectional study carried out at the national orthopedic hospital, Dala, Kano. It is a questionnaires based study on elderly patient age 60

and above who met the inclusion criteria. The study was conducted between July 2013 to December 2014) at the national orthopedic hospital, Dala, Kano, Nigeria. Ethical approval was obtained from the hospital research ethics committee ON 14/10/2012. (NOHD/RET/ETHIC/60).

The sample size was obtained using a pilot study that was conducted from Jan 2011 to June 2012 (1.5yrs) and the required sample size for the study was calculated from the result using the formula.^[16,17]

$$n = \frac{N}{1 + N(e)^2}$$

Where n= required sample size

N= required population size i.e.

e= margin of error at 5% (standard value of 0.05) and confidence level of 95%

From the pilot study carried out from January 2011 to June 2012 (1.5yrs)

A total number of 44 patients had hemiarthroplasty; 24 patients were elderly patients with fracture neck of femur and none was multiply injured

Sample size n = 24

$$\frac{1+24(0.05)^2}{22.6} = 21.75 = 22.6$$

22.6 was rounded up to 23

10% of calculated Value = 2 (to serve as attrition)

Thus required sample size = 23 + 2 = 25 patients.

All elderly patients above 60years with fracture neck of femur who consented for the study with no chronic debilitating condition, and who were fit to be interviewed were recruited in to the study. All patients with cognitive impairment, those too sick to be interviewed, multiply injured patient and those who did not consent were excluded from the study.

Protocols

All patients selected had either a cemented or cementless with the choice base on state of calcar, degree of osteopenia or Dorr index. The prostheses used for surgery is 135 degree hip prostheses manufactured and marketed by ORTHOTECH INDIA (orthotechindia.com) for both the bipolar cemented, cementless and unipolar implants (Appendix eight and nine). The cement powder used was that produced by Synimed- synergie ingenierie medicale (SARL, EUROFIX G40) France.

Two patients had pre-operative skeletal traction for two weeks prior to surgery due to proximal migration of the femur.

Patients who were on admission for three days or more were placed on low molecular weight heparin and discontinued 24hrs before surgery. Informed consent was obtained for surgery.

All patients had either a general or regional anesthesia. Prophylactic antibiotics were given at induction of anesthesia.

All surgery was performed via an anterolateral approach by at least a senior resident or the consultant for this study. All patients had post-operative analgesic using a multimodal method (paracetamol, pentazocine and diclofenac) as well as extended antibiotic prophylaxis for 5 days. Quadriceps exercises were commenced 24-48hours after surgery. Post-operative radiograph were taken 48-72hours after surgery following which ambulation was commenced in all patients. All patients were discharged home when they were confident ambulating to the outpatient physiotherapy and surgical outpatient departments. Quality of life was re-assessed at six months after surgery using EQ-5D and the EQ-VAS forms.

Measures and data collection

All patients had clinical evaluation using both interviewer and self-administered questionnaire which contained information on biodata, pre injury ambulation status and co morbid conditions (Appendix seven). Clinical examinations and radiographs were done and the fracture was classified based on Garden's classification and recorded. Full blood count, urea and electrolyte, ECG (electrocardiograph), and chest X-ray were requested as part of preparation for surgery and results noted.

The quality of life was assessed using EQ-5D questionnaire (Appendix four to six). Both the EQ-5D descriptive system and the EQ-VAS forms were administered and analyzed before and after surgery.^[16,17]

All data collected were recorded for each patient and input into Microsoft excel. Demographic variables were represented using tables and charts. Absolute numbers and simple percentages were used to describe categorical variables. The statistical analyses of the results was done using Microsoft excel and SPSS version 17.0 and the significance level was set at

$P \leq 0.05$. Quantitative variables were described using measures of central tendency (mean, median) and measures of dispersion (range, standard deviation) as appropriate. Test of associations for quantitative variables were done using student's t test and for qualitative variables using Chi square test.

Results

Twenty five patients 60yrs and above with fracture neck of femur who had hemiarthroplasty were studied. Table 1 shows the demographic profile of the patients. The mean age of the patients was 71.68 with an age range of 60-92years. 14 patients (56%) were within the age range of 60-70years. 4 patients (16%) were within 71-80yrs, 5 patients (20%) were within 81-90yrs and 2 patients (8%) within 90-100yrs. Eight patients (32%) were females while 17 patients (68%) were males. M:F of 2.1:1. Twenty one patients (84%) were married while 4 patients (16%) were widows.

Occupational distribution as depicted in Figure 1 showed that 8 patients (32%) were dependents; another 8 patients (32%) were traders. 5 patients (20%) were retired civil servants. Others included were Farmer, Technician, Traditional ruler and civil servant, each contributing 1 patient (4%).

Table 2 shows the change in quality of life indices observed during the pre-operative period and six months after surgery using the EQ-5D questionnaire.

25 patients (100%) all reported problems with mobility at the pre-operative period. At the 6th month after surgery, 16 patients (64%) had no problems with mobility and 9 patients (36%) still had problems with mobility. This change observed was statistically significant using chi-square test ($P < 0.05$). Similarly, 25 patients (100%) had problems with self-care at the pre-operative period and at 6th month after surgery, 20 patients (80%) had no problems with self-care and 5 patients (20%) had problems with self-care. This observed change was statistically significant using chi-square test ($P < 0.05$). Twenty five patients (100%) had problems with carrying out usual activities before surgery; only 7 patients (28%) still had problems with carrying out usual activities at 6th month after surgery while 18 patients (76%) had no problems. This was also statistically significant ($P < 0.05$)

Twenty five patients (100%) had problems with pain before surgery. 6th month after surgery, only 7 patients (28%) had problems with pain. 18 patients had no pain after surgery. This difference was also statistically

significant using chi-square test ($P < 0.05$). Twenty five patients (100%) had anxiety and or depression before surgery. 6 months after surgery, 23 patients (92%) were neither anxious nor depressed. 2 patients (8%) were still depressed. Using chi-square test, the observed change was statistically significant ($P < 0.05$).

Figure 2 is a bar chart showing the changes observed before and 6 months after hemiarthroplasty for the various quality of life indices. There are marked decreases in the number of patients reporting problems 6 months post hemiarthroplasty.

Table 3 shows the mean VAS score and standard deviation observed before and six months after surgery. The mean VAS Score at the pre-operative period was 38.2, whereas at 6 months after surgery, the mean score rose to 70.8. This change was statistically significant using student's t test ($P < 0.05$).

Table 1: Socio-demographic characteristics of study respondents

Variable	n=25	%
Age group		
60-70	14	56
71-80	4	16
81-90	5	20
91-100	2	8
Gender		
Male	17	68
Female	8	32
Marital status		
Married	21	84
Widow	4	16

Table 2: Changes observed in Quality of life indices at pre-operative period and 6 months post-operative for the subjects

EQ-5D DIMENSION	Pre Op	6 th Month Post Op	P value
No problems Mobility	0+	16+	<0.0001
	Problems	9+	
Self care	No problems	0+	<0.0001
	Problems	25+	
Usual Activity	No problems	0+	<0.0001
	Problems	25+	
Pain	No problems	0+	<0.0001
	Problems	25+	
Anxiety/ Depression	No problems	0+	<0.0001
	Problems	25+	

Table 3: VAS Score at pre-operative period and at 6 months post operatively

Variables	Mean VAS	Standard deviation	P-value
Pre op VAS	38.2	11.44	<0.0001
6 th Month post op VAS	70.8	9.86	

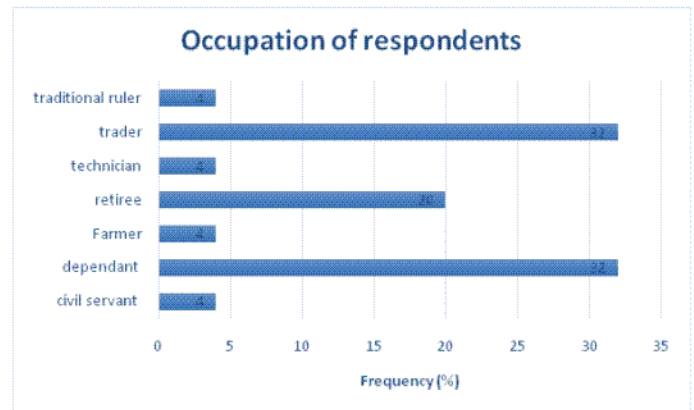


Figure 1: Occupational distribution of patients

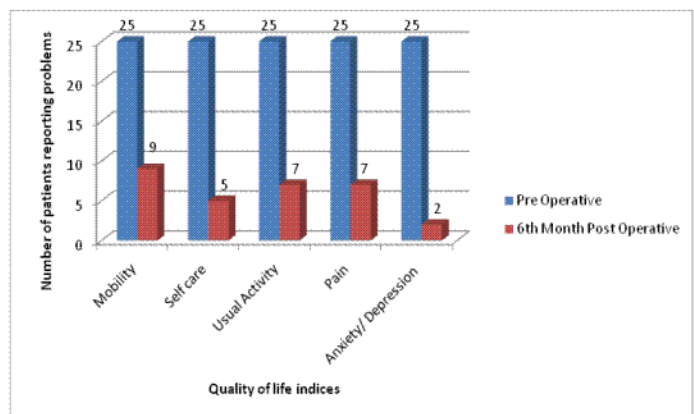


Figure 2: Bar chart showing changes in number of patients reporting problems at pre-operative period and 6 months after surgery

Discussion

The mean age of the patients in this study was 71.9. This is similar to findings of Mue D et al and Eyichukwu et al in Makurdi and Enugu, Nigeria respectively.^[8,18] This may be due to the fact that both population are Nigerians with similar demographics and life expectancy. Parker MJ et al found a mean age of 80.8 in the United Kingdom in their study on comparing internal fixation and hemiarthroplasty in the elderly.^[19] This observed difference may be due to the better and longer life expectancy in the Caucasians and Western World generally.

There was male preponderance in this study. This is similar to the findings of Mue D et al and Onche et al.^[18] This may be due to the fact that both study population are from the same region with similar demographics. However, Eyichukwu G et al found equal male and female ratio in their study.^[8] This is likely because they studied both the elderly and those in the middle.

It is an established fact that elderly patients with fracture neck of femur that are left untreated do have significance reduction in their general health related quality of life. Hence, the general consensus is to treat them operatively by fixation or replacement arthroplasty so as to give the best quality of life as close as possible to the pre-injury state.^[4,5,18-22] This study also demonstrated a significantly better health related quality of life after hemiarthroplasty for femoral neck fracture in the elderly. This significant improvement was seen using both the EQ-5D descriptive system and the EQ-VAS ($P < 0.05$)

Shen J et al while evaluating the quality of life of 52 elderly patients, who underwent hip hemiarthroplasty for femoral neck fracture one year earlier, concluded that hemiarthroplasty should be actively adopted as this is associated with a good quality of life.^[23] Takeshi Chikude et al while assessing the quality of life among elderly patients ($n=30$) with femoral neck fractures treated by partial hip replacement concluded that partial arthroplasty with Thompson's endoprotheses in the elderly after femoral neck fracture followed up for 11 months enables a good quality of life.^[24] Their results are comparable to findings in this study, however, assessment of quality of life are higher than that of this study which was done after 6 months in both studies.

Some researchers however have found contrasting results. Vatansever et al while assessing the quality of life after hemiarthroplasty for proximal femoral fractures observed that patients with femoral neck fractures (Group 1) treated with hemiarthroplasty showed a decrease in health related quality of life.^[25] This observation differs from findings in this study. This may be because their indices for assessing the quality of life were mental and physical health. They however further concluded that hemiarthroplasty enabled the patients to maintain basic activities of daily living.

Similarly Gjertsen JE et al in the study of Norwegian hip register found that Patients operated with

hemiarthroplasty had less pain, were more satisfied with the result of the operation, and had better EQ-5D index score 4 months postoperatively than patients who were operated with internal fixation.^[26] This is similar to what was found in this study, though the age in their study was 70 and above and the period of follow up was 4 months.

Conclusion

Hemiarthroplasty for fracture neck of femur significantly improve the health related quality of life as demonstrated by this study. The EQ-5D and EQ-VAS health questionnaire are a valuable tool in assessing the health related quality of life (QoL) following hemiarthroplasty.

We recommend therefore, that more studies comparing internal fixation and hemiarthroplasty or non-operative management and internal fixation be conducted to give in depth information about fracture neck of femur and its management in our environment.

Conflict of Interest: None to declare.

References

1. WHO, Definition of an older or elderly person; www.who.int/healthinfo/survey/ageingdefnolder/en/index.html
2. Raia FJ, Chapman CB, Herrera MF, Schweppe MW, Michelsen CB, Rosenwasser MP. Unipolar or bipolar hemiarthroplasty for femoral neck fractures in the elderly? *Clinical Orthopaedics and Related Research* (1976-2007). 2003 Sep 1; **414**:259-65.
3. Helen HGH, Catherine S, Jenson CSM, intervention for improving mobility after hip surgeries in adults. *Cochrane Bone, Joint and Muscle Trauma Group*; 2011; 1
4. Sancheti KH, Sancheti PK, Shyam AK, Patil S, Dhariwal Q, Joshi R. Primary hemiarthroplasty for unstable osteoporotic intertrochanteric fractures in the elderly: A retrospective case series. *Indian journal of orthopaedics*. 2010 Aug;
5. Wang J, Jiang B, Marshall RJ, Zhang P. Arthroplasty or internal fixation for displaced femoral neck fractures: which is the optimal alternative for elderly patients? A meta-analysis. *International orthopaedics*. 2009 Oct; **33**:1179-87.
6. Ugbeye ME, Dim EM, Obideyi OF. Profile of fracture neck of femur in a Nigerian regional

- hospital. *Nigerian Journal of Orthopaedics and Trauma*. 2017;16:37-44
7. Ogunlade SO, Alonge TO, Idowu OE, Hip fractures in a tropical teaching hospital; *Afr J Med Med Sci*; 2003, Mar vol 32;13-16.
 8. Eyichukwu GO, Iyidobi EC; Austin Moore hemiarthroplasty: The Enugu experience; *Nigerian journal of medicine*, Apr 2007, Vol 16; 125-8.
 9. John Ebenezar; Textbook of orthopedics; JayPee brothers medical publishers Ltd; 4th Ed 2010;655-656
 10. Gary Heyburn; Perioperative management of hip fractures; *Clin Orthop Rel Res*; Apr 2012; Vol 425;35-37
 11. Solomon L, Warwick D, Nayagam S; Apley's system of Orthopedics and fractures; *Hodder Arnold*; 9th Ed 2010;847-848
 12. Adnan A Faraj; Non operative treatment of elderly patients with femoral neck fracture; *Acta Orthop. Belg.*; 2008; Vol 74; 627-629
 13. Raymakers El, Marti RK; Non operative treatment of impacted femoral neck fractures; A prospective study of 170 cases; *J Bone Joint Surg*; 1991;Vol 73-B;950-954
 14. EuroQol Group. EuroQol-a new facility for the measurement of health-related quality of life; *Health policy* 1990; Vol 16;199
 15. Devlin NJ, Brooks R. EQ-5D and the EuroQol group: past, present and future. *Applied health economics and health policy*. 2017 Apr 1;15:127-37
 16. Del Águila MR, González-Ramírez AR. Sample size calculation. *Allergologia et immunopathologia*. 2014 Sep 1;42:485-92.
 17. Pourhoseingholi MA, Vahedi M, Rahimzadeh M. Sample size calculation in medical studies. *Gastroenterology and Hepatology from bed to bench*. 2013; 6:14.
 18. Daniel M, Mohammed S, Francis A, William Y, Joseph K, Cornilius E. Early result of hemiarthroplasty in elderly patients with fracture neck of femur. *Nigerian medical journal: Journal of the Nigeria Medical Association*. 2015 Jan; 56:64
 19. Parker MJ, White A, Boyle A. Fixation versus hemiarthroplasty for undisplaced intracapsular hip fractures. *Injury*. 2008 Jul 1; 39:791-5.
 20. Rogmark C, Leonardsson O. Hip arthroplasty for the treatment of displaced fractures of the femoral neck in elderly patients. *The bone & joint journal*. 2016 Mar; 98:291-7.
 21. Ravikumar KJ, Marsh G. Internal fixation versus hemiarthroplasty versus total hip arthroplasty for displaced subcapital fractures of femur—13 year results of a prospective randomised study. *Injury*. 2000 Dec 1; 31:793-7
 22. Mate GB, Mahi G, Sahebrao S. Short term results following hip arthroplasty (total/hemi) in elderly patients with femoral neck fracture in a tertiary care hospital. *International Journal of Orthopaedics*. 2020;6:880-4.
 23. Shen J, Sun CT, Huang GY; Evaluation of the postoperative quality of life in the elderly over 80yrs old who underwent hip hemiarthroplasty for femoral neck fracture; *Zhonghua Wai Ke Za Zhi* 2004 Dec 7; 42:1409-11
 24. Takeshi C, Edison NF, Emerson KH, Nelson KO, Carlo M; Assessment of quality of life among elderly patients with femoral neck fractures surgically treated by partial hip arthroplasty; *Acta. Ortop. bras*. 2007, Vol 15 113-124
 25. Vantanserver A, Ozic U, Okcu G; Assessment of quality of life of of patients after hemiarthroplasty for proximal femoral fractures; *Acta Orthop Traumatol Turc*. 2005 39; 237-42
 26. Gjertsen JE, Vinje T, Lie SA, Engesæter LB, Havelin LI, Furnes O, Fevang JM. Patient satisfaction, pain, and quality of life 4 months after displaced femoral neck fractures: a comparison of 663 fractures treated with internal fixation and 906 with bipolar hemiarthroplasty reported to the Norwegian Hip Fracture Register. *Acta orthopaedica*. 2008 Jan 1; 79:594-601.