

REHABILITATION CARE OUTCOME OF LOWER LIMB FRACTURES IN A NIGERIAN TEACHING HOSPITAL-A RETROSPECTIVE STUDY

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SUMMARY

Fracture is a common cause of injuries to lower extremities. It is clinically assumed that younger and male patients have better outcome following acute care rehabilitation of lower limb fractures. This study was therefore carried out to investigate pattern and outcome of acute care rehabilitation of lower limb fractures.

All cases of unilateral lower limb fractures referred for physiotherapy at LAUTECH Teaching Hospital, Osogbo, Nigeria between November, 2001 and October 2006 were reviewed. Information on personal and clinical characteristics relating to acute care rehabilitation was retrieved from their case files. Data obtained were analyzed using descriptive and inferential statistics.

A total of 197 patients of male to female ratio 2.3:1 with mean age 38.7 ± 17.77 years were reviewed. Majority (48.2%) were aged 20-39 years. Majority of the patients (74.6%) under review were involved in road traffic accident with a half of them (51.3%) sustaining fracture of femur. A large proportion of patients (47.7%) under review were managed non operatively. More than half of these patients (67.8%) completed their ambulation training with axillary crutches within three physiotherapy sessions with 148(75.1%) patients discharged satisfactorily with either

axillary crutches or walking frame. Outcome of ambulation training was found to be associated with age ($p=0.03$) but was neither associated with gender ($p=0.12$) nor methods of reduction of fractures ($p=0.31$).

Age is a significant determinant of outcome of rehabilitation of fractures of lower extremities. In other words, the younger a patient with lower limb fracture is, the better the outcome of acute care rehabilitation.

Key words, lower limb fractures, rehabilitation outcome

INTRODUCTION

An injury which commonly occurs in the lower limbs is fracture involving bones of the lower extremities¹. In the United Kingdom, lower limb fractures account for approximately one third of all fractures with overall incidences of 3.4 per 1000 person years in women and 2.9 per 1000 person years in men between 1990 and 2001². Hospital based studies in Nigeria and overseas have identified lower limb as the most common location of fractures with tibia reported as the most commonly fractured bone in the lower extremities³⁻⁵.

Majority of lower limb fractures occur as a result of road traffic accident involving vehicle, motorcycle, or pedestrians and fall^{6, 7}

Risk factors for lower limb fractures (medical or non medical) include road traffic accident, dementia, osteoporosis, smoking and medications among others^{2, 6-7}. Medical risk factors lower limb fractures vary across different age group. Kaye and Jick² reported that dementia was a major risk factor for sustaining fracture of femur among people aged 80 years above. The authors also submitted that smoking and osteoporosis were important predictors of fractures of pelvis and femur among the elderly (50 -79 years).

Lower limb fractures are often managed by close reduction and splinting. However, surgical interventions are required in cases of femur and open tibia fractures^{4, 6}. Rehabilitation is an important component of holistic care of patients with lower limb fractures pre and post reduction⁸. The seven milestones of functional recovery following hip fractures as described by Giuccione et al⁹ include supine to sit transfer, sit to supine transfer, sit to stand transfer, independent ambulation on leveled surface with walker, independent ambulation on leveled surface with crutches, independent ascent and descent of stairs with a railing and crutches and independent ascent and descent of stars with crutches only. Attaining independence in the first five keys was also identified as the goals of acute care rehabilitation following hip fractures. A number of personal characteristics and clinical factors have been studied for their association with functional outcomes in hip fractures. These include age¹⁰⁻¹², gender^{10,12,13}, cognitive status¹⁴, history of previous fractures^{12,15}, site and side of fractures^{10-12,15} surgical fixation^{12,15}, physical therapy treatment^{12,13,15,16} and length of hospital admission^{13,16}.

The prevalence, socio-economic burden, surgical and rehabilitative care for hip fracture are well documented in literature⁸⁻¹⁶. However, few studies explored pattern of lower limb fractures and there is a dearth of information on rehabilitation outcome of lower limb fractures particularly in developing countries. This study was designed to investigate the outcome of acute care rehabilitation of lower limb fracture. Factors

predicting outcome of acute care rehabilitation following fractures of lower extremities were also identified.

METHODOLOGY

Procedure for data collection: The authors reviewed all cases of unilateral lower limb fractures referred to physiotherapy department of Ladoke Akintola University of Technology Teaching Hospital, Osogbo between November, 2001 and October, 2006. Cases of bilateral, multiple lower limb fractures and lower limb fractures complicated with head injury were excluded from the study. The following information was retrieved from the case files of patients who met the inclusion criteria: age, sex, pre-morbid ambulation status, sites, causes and method of reduction of fractures. Other data obtained were number of physiotherapy sessions, means of ambulation, complication on ambulation training and outcome of acute care rehabilitation.

Premorbid ambulation status was classified as ambulant with aids, non ambulant or independent ambulation. Acute care rehabilitation was defined as having attained the first five milestones of functional recovery as earlier described by Guicionnes et al⁹. Outcome of acute care rehabilitation was classified as: discharged from rehabilitation programme against physiotherapist's advice, discharged satisfactorily, discharged on supervision by close relatives and inconclusive training in the use of axillary crutches or walking frame for non-weight bearing ambulation training. Moreover, a patient was said to have been discharged satisfactorily having learnt the usage of axillary crutches or walking frame without supervision whereas discharged unsatisfactorily if otherwise as stated earlier.

DATAANALYSIS

Descriptive statistics of mean and frequency percentages were used to summarize and present data on patients' demographic characteristics, causes, site and method of reduction of lower limb fractures and acute care rehabilitation outcome. Chi

the Federal Road Safety Commission can now be regarded as an important preventive measure of curtailing incidence of lower limb fractures.

Majority of patients under review had fractures affecting femur (50.3%) and shaft of tibia and fibula (24.5%). These findings were at variance outcomes of previous studies³⁻⁵ in Nigeria and overseas that reported the shaft tibia and fibular as most common sites of lower limb fractures. The low incidence of fractures of tibia and fibula as revealed in this study could be attributed to the fact that large proportions of these patients were not hospitalized. About a half of patients under review were managed by close reduction and splinting (Plaster of Paris and traction). This confirmed earlier findings by Oluwadiya et al³ and Odelowo⁷ in which majority of patient were managed non-operatively. However, the proportion of patients managed by internal fixation in this study was higher than those of previous studies^{3,6}. This could be due to the fact that the considerable proportion of patients in our study sustained fractures of femur than those reported in previous studies^{3,5}.

Majority of patients (87.3%) under review were trained to ambulate with axillary crutches. This may be because majority of the patients were young adults who could easily comprehend and handle crutch ambulation. More than half of the patients under review (67.8%) completed ambulation training within three physiotherapy treatment sessions while others completed their training after four or more treatment sessions. The duration of completion of ambulation training may be attributed to age distribution of the patients under review and method of reduction of fracture that predominated in the study. In other words, young adults with internal fixation or Plaster of Paris had shorter duration of training than the elderly or patients managed on traction. However, the outcome of ambulation training of patients under review was not associated with the methods of fracture reduction as expected. These findings may be as a result of limitation imposed by our research design being a retrospective study. We

therefore recommend the need for carrying out prospective studies to investigate the association between outcome of acute care rehabilitation of fractures and method of reduction of fractures.

The association between means of ambulation training and outcome of ambulation training, invariably, the outcome of acute care rehabilitation as revealed in this study could also be due to age distribution pattern and fracture management procedures earlier explained. It is often clinically assumed that young and male patients may have better outcome of ambulation training. On the contrary, our findings revealed association between outcome of training and age but not gender. Similarly, it is clinically assumed that patients with internal fixation (ORIF) and closed reduction by Plaster of Paris should be able to learn ambulation with crutches or frame faster than those on traction. However we found out that outcome of ambulation training was not associated with fracture management procedures.

CONCLUSION

This study revealed that more males than females sustained lower limb fractures across all age groups. Fractures of lower extremities affect active segment of the patients under review. Moreover road traffic accident is a major cause of lower limb fractures with high proportion of fracture of femur. Preventive measures aimed at reducing road collision could play a significant role in curtailing incidence of lower limb fractures in our society. Age is an important determinant of outcome of ambulation training following fractures of lower extremities.

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TABLE 1

Age by sex Distribution of patients with lower limb fractures referred for physiotherapy.

Age group (Years)	Sex		Total (%)
	Male (%)	Female (%)	
<9	2 (1.0)	3 (1.5)	5 (2.5)
10-19	8 (4.1)	5 (2.5)	13 (6.6)
20-29	45 (22.8)	13 (6.6)	58 (29.4)
30-39	22 (11.2)	15 (7.6)	37 (18.8)
40-49	21 (10.7)	5 (2.5)	26 (13.2)
50-59	20 (10.2)	8 (4.1)	28 (14.2)
60 and above	20 (10.2)	10 (5.0)	30 (15.2)
Total	138 (70.1)	59 (29.9)	197 (100.0)

Table 2
Causes and sites of lower limb fractures referred for physiotherapy

Clinical Characteristics	Frequency (%)
Causes of Fracture	
Road Traffic Incident	147 (74.6)
Fall	33(16.8)
Gunshot	8 (4.1)
Industrial Accident	6(3.0)
Pathology	3 (1.5)
Fracture Sites	
Tibia /Fibula	57 (28.9)
Tibia	33 (16.8)
Femur	101 (51.3)
Femur and Tibia	5 (2.5)
Pelvis	3 (1.5)

Table 3
Fracture management procedures of lower limb fractures referred for physiotherapy

Fracture management Procedures	Frequency (%)
Traction (Skin / Skeletal)	27 (13.7)
Plaster of Paris (POP)	67 (34.0)
Open reduction and Open reduction with internal fixation (ORIF)	64 (32.5)
Athroplasty	1 (0.5)
Hemi arthroplasty	2(1.0)
Not identifiable (not recorded)	36 (18.3)

Table 4
Association between age and outcome of acute care rehabilitation of cases of lower limb fracture seen at physiotherapy

Age (Years)	Outcome		Total	X ²	P	Comment
	Satisfactory (%)	Unsatisfactory (%)				
9	2(1.0)	3(1.5)	5(2.5)	15.49	0.03	S
10 -19	6(3.0)	7(3.6)	13(6.6)			
20 -29	49 (24.9)	9 (4.6)	58 (29.4)			
30 -39	28 (14.2)	9(4.6)	37 (18.8)			
40.49	19 (9.6)	7(3.6)	26 (13.2)			
50 -59	23(11.7)	5(2.5)	28 (14.2)			
60 and above	22 (10.7)	8 (4.5)	30(15.2)			
Total	148 (75.1)	49 (24.9)	197 (100.0)			

Key S = Significant at alpha level <0.05

Table 5
Association between means of ambulation training and outcome of rehabilitation of lower of lower limb fractures referred for physiotherapy

Means of Ambulation	Outcome			Total (%)	X	P	Comment
	Satisfactory (%)	Unsatisfactory (%)	Total (%)				
Crutches	137 (69.5)	38 (19.3)	175 (88.8)	11.31	0.03	S	
Walking frame	11(5.6)	11 (5.6)	22 (11.2)				
Total	148 (75.1)	49 (24.9)	197(100.0)				

Key: S=Significant at alpha level <0.05

Table 6
Association between sex and outcome of rehabilitation of lower of lower limb fractures referred for physiotherapy

Gender	Outcome			Total (%)	X	P	Comment
	Satisfactory (%)	Unsatisfactory (%)	Total (%)				
Male	108(54.8)	30 (15.3)	134 (70.1)	2.42	0.12	N.S	
Female	40 (20.3)	1 9(9.6)	59 (29.9)				
Total	148(75.1)	49 (24.9)	197 (100.0)				

Key: N.S = Not Significant at alpha level <0.05