

**ORIGINAL ARTICLE****CHOICES FOR OPERATIVE MANAGEMENT OF FRACTURES IN A DEVELOPING COUNTRY**Baidoo Richard Ogirma, FWACS<sup>1</sup>, Odei-Ansong Francis, FWACS<sup>1</sup>, Baidoo Ebikela Ivie, FWACS<sup>1</sup>**ABSTRACT**

**Introduction:** Fracture fixation in poor countries is hampered by lack of financial resources. It is important to define what fracture types present for surgery to channel scarce resources appropriately.

**Objectives:** This study describes the commonest fractures treated surgically, and operative fixation methods used in patients who presented for operative fracture fixation.

**Methods:** A retrospective review of all patients who have had operative fixation of fractures at the Cape Coast Teaching Hospital and St. Joseph Orthopaedic hospital located in the Central and Eastern Regions of Ghana, respectively, between January 2016 to December 2018. We reviewed the operation records of 1,168 for their age, gender, fractured bone, type of fracture, operative fixation method and devices used for fixation.

**Results:** A total of 1,168 patients were treated operatively irrespective of age in the three-year period reviewed. Male (817) to females (351) ratio of 2.3:1. Only hip fractures (60%) were more common in females. The 21 – 40 years age group had the highest number of fractures (50% of femur fractures, 52% of tibial and 56% of forearm fractures) and operative procedures. Plate osteosynthesis was found to be the most preferred method of fixation for the major long bones - femur 360 (66 %), humerus 69 (78% ), radius and ulna 81 (78%).

**Conclusion:** Scarce resources should be channelled towards acquiring the requisite instrumentation and skill set for the fixation of tibial and femur fractures in the short term as these fractures represent the most commonly fixed fractures in a resource poor setting.

**Keywords:** Fractures, operative fixation method, orthopaedic services, hospitals.

**INTRODUCTION**

The operative management of fractures has evolved dramatically over the last century with the introduction of devices and procedures that enhance fracture healing, permitting a quick return to pre-injury functional levels and overall better outcomes (1,2). It is also evident that musculoskeletal injuries are on the rise with a disproportionately large number of severe and fatal injuries occurring in countries with limited resources (3) and these injuries are projected to rise over the next few decades (4).

There are still huge gaps in access to surgical care especially in developing/Low-Middle Income Countries (LMICs) like the sub-Saharan countries of Africa (5,6). It is inevitable that when musculoskeletal injuries occur in these parts of the world, victims often allow these conditions to run their natural courses or seek the services of traditional bone setters with sometimes devastating consequences like limb loss and life-changing deformities (7,10).

A lot of non-operative methods currently employed in the treatment of fractures may be outdated, unreliable with inconsistent results and overall not cost-effective (11,12), but the availability of skill and requisite facilities for the operative fixation of fractures when required is in short supply and there are several barriers to accessing surgical intervention for fracture care (13).

Trauma systems and registries are unavailable and as a result there is little or no information as to what kinds of fractures are treated operatively and what methods of fracture fixation are employed by the few trained surgeons working in such deprived environments. It is difficult for hospital managers and health officials who want to acquire orthopaedic implants and instrumentation for treatment centres in poor countries to determine what kinds of cases present for surgical treatment and by extension what implants/instrumentation will be cost effective.

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The purpose of this retrospective study was to describe the fractures most commonly treated operatively in a setting where most fractures are handled by traditional bone setters, type of fractures and operative fixation methods offered to patients presenting for orthopaedic care in two hospitals in Ghana.

## METHODS

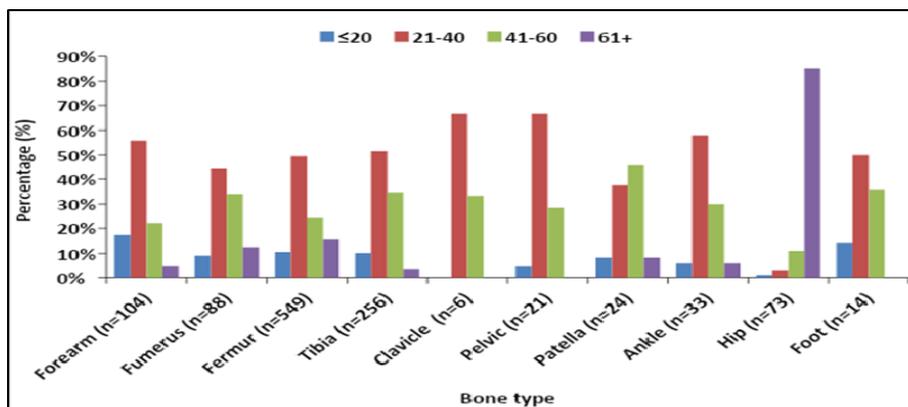
This study reviews all patients who have had operative fixation of fractures at two hospitals with established orthopaedic services. The Cape Coast Teaching Hospital is located in the Central region of Ghana and serves as the main referral facility for the Central and Western regions while the St. Joseph Orthopaedic hospital, located in Koforidua in the Eastern region of Ghana, with a bed capacity of 400 has been offering orthopaedic services for more than four decades. We set out to identify what fractures are treated operatively in a society where fracture care is dominated by unorthodox/traditional practitioners.

Operation records of 1,168 consecutive patients who had operative fracture fixation over a three-year period (Jan 2016 – Dec 2018) were reviewed retrospectively.

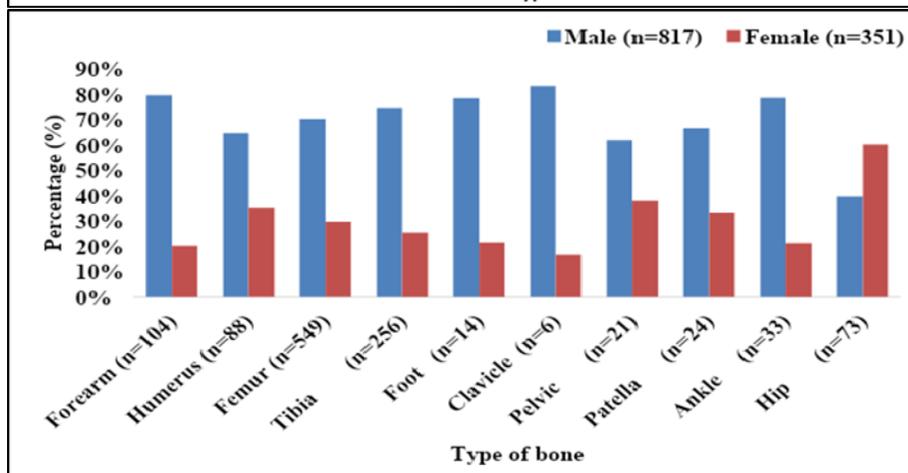
Information obtained includes age, gender, fractured bone, type of fracture, operative fixation method and devices used for fixation. Ethical clearance for use of secondary data was sought and obtained from the ethical committee of the Cape Coast Teaching Hospital.

## RESULTS

A total of 1,168 fractures were treated operatively in all age groups in the three-year period reviewed. Femoral shaft fractures (549) were the most commonly operated upon representing 47% of all fracture fixations. Tibial, humeral and forearm fractures recorded (22%), (8%) and (9%) respectively. Clavicular, Pelvic, Ankle, Patellar, Hand and Hip fractures collectively made up the remaining 14% of operatively managed fractures (Figure 1). Males (817) accounted for 70 % of the cases and females made up 30 %. There were more males in all fracture categories except for hip fractures where females (44) accounted for 60% (Figure 2). The 21 – 40 years age group had the highest number of procedures. This group accounted for 50% of femur fractures, 52% of tibial and 56% of forearm fractures.



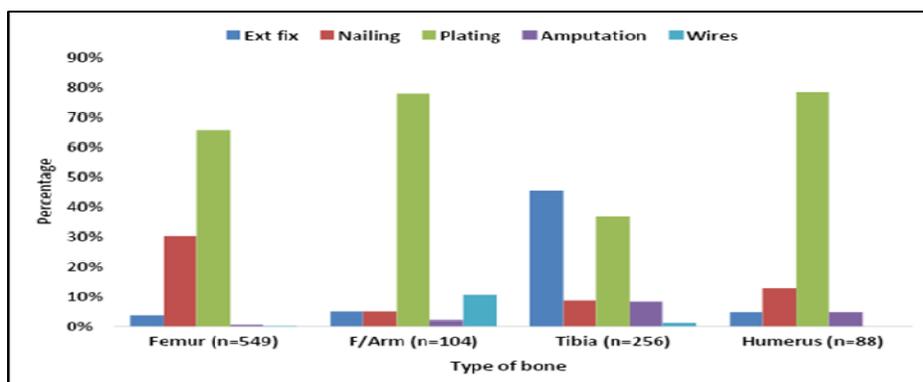
**Figure 1:** Age distribution of patients with operated fractures (n=1168).



**Figure 2:** Sex distribution of patients with operated fractures (n=1,168)

Plate osteosynthesis was the preferred method of fixation for the major long bones - femur 360 (66%), humerus 69 (78%), radius and ulna 81 (78%). One hundred (30%) of femoral fractures were treated by intramedullary nailing with intramedullary nailing being employed in 22 (9%) of tibial fractures.

The commonest fracture requiring external fixation was the tibia being required in 116 (45%) of tibial fractures. Only in 19 (3%) of femoral fractures were external fixators applied. Overall, 30 (3%) required primary amputation with the majority (70%) in patients with tibial fractures (Figure 3).



**Figure 3:** Operative procedures for long bone fractures (n=997).

## DISCUSSION

Though a decision to have operative fixation of fractures in LMICs is not a straight-forward one as it is influenced by a complex interplay of sociocultural, financial, infrastructural and technical factors (12,13), there is an increasing number of patients who are opting for orthodox methods of fracture fixation. Knowing what fractures individuals will want treated surgically will go a long way in enhancing planning and provision of resources for orthopaedic surgical care.

Our study reveals that femur shaft fractures were the most common fractures treated operatively accounting for 47% of all operations. A Tanzanian study showed a similar preponderance of femur fractures presenting to hospital for treatment and being treated by locked intramedullary nailing (14). Although locked IM nailing is the gold standard for treating femur shaft fractures (12), our study showed that plating is still a popular method of fixation for femur fractures probably due to both hospitals not being on the Surgical Implant Generation Network (SIGN) programme and plating is relatively easier in a resource poor setting than locked IM nailing for some fracture configurations (15). For an environment where traction is still in use for treating femur fractures, any acceptable method of fracture fixation is still more cost effective (11).

The commonest operative procedure performed for tibial fractures was external fixation which mirrors studies at KCMC which showed a relatively decreased use of IM nailing for tibial fractures (16) as non-operative fracture techniques/traditional bone setting techniques are utilized in treating closed tibial fractures.

Surprisingly, our results reveal a higher use of plate fixation for tibial shaft fractures compared to IM nailing despite evidence that the latter procedure yields better results (15). In keeping with other studies in the sub-region the 21- 40 age group had the highest operative intervention for all types of fractures apart from hip fractures which were predictably more in those greater than 60 years (11,17). There were more surgical interventions in males than females. This can be explained by worldwide statistics which show more males with fractures in individuals less than 60 years.

Ankle fractures are relatively common but most patients in this part of the world opt for non-operative means/treatment by traditional bonesetters (18,19). Our study showed that ankle fractures accounted for only 33 (3%) of all operated fractures.

### Conclusion

As more patients begin to acquiesce to having operative fracture fixation when indicated, it is imperative to define what fractures are most commonly treated operatively in this sub region and this study answers that question. Fractures of the femur and tibial shafts represented an overwhelming majority of such fractures. This will imply that scarce resources should be channelled towards the fixation of these fractures using methods with the most reliable outcomes. In planning instrumentation and implant use for hospitals, it becomes imperative to dedicate a greater percentage of funds for acquisition of implants and instrumentation for fixation of femur and tibial shaft fractures.

This is not to say that less frequently operated fractures should be ignored, but when planning surgical units, a great deal of care should go into preparing for the most commonly fixed fractures.

### ***Competing Interest***

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists

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