

# Morphometric Study of the Proximal Dry Femur and its Potential Application in Prosthesis Designing in Tanzania

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**Background:** Total hip arthroplasty and hemiarthroplasty are currently common procedures in our setting. Subluxation and periprosthetic fracture of the femur has been reported. This can be linked to the undersize and oversize of the prosthesis since most of these prosthetics are western standardized. This is partly because of lacking data on the size of the proximal femur. Knowledge about the different diameters of the head, neck, and length of the femur is essential in orthopedic surgery and radiology, and forensic medicine. These normative values are necessary for plastic and reconstructive surgeons in their reconstruction and medical rehabilitation. However, the anatomical and anthropological statistical analysis of femoral anthropometry among different populations reveals an excellent variation for all human races. The present study aimed at determining morphometric measurements of proximal femur among Tanzania black people

**Methods:** The study involved 97 undamaged dry bones left femur 35, right femur 50, and 12 acetabula. Preserved in the anatomy laboratories at medical universities in Dar es Salaam, Tanzania. The parameters evaluated were femoral head diameter, femoral neck width, lateral and anteroposterior femoral neck length, femur length, acetabular diameter, and height. They were measured using Vernier caliper, non-elastic thread, and osteometric board.

**Results:** The femoral length had a range of 400-520 mm with the mean of  $454.1 \pm 30.3$  mm, head diameter had a range of 34-54 mm with the standard of  $44.4 \pm 3.8$  mm, and neck width had the range of 25.2-40 mm with the mean of  $31.7 \pm 3.3$ . The anterior and posteroanterior neck lengths measure 15-36 mm and 25-48 mm with the mean values of  $23.2 \pm 4.2$  and  $36.8 \pm 4.3$  mm, respectively. The mean values of acetabular width and diameter were  $52.3 \pm 2.93$  mm and  $48.9 \pm 2.78$  mm, respectively.

**Conclusion:** The values obtained from the Tanzania population should be considered on orthopedic decisions for implants to be used. However, more robust studies are needed to corroborate these findings.

Keywords: Femur head, neck, morphometric, acetabulum.

