African Journal of Research in Medical and Health Sciences
https://doi.org/10.71921/ajrmhs.vol4no1.130

RESEARCH *Open Access*

COMPLICATIONS AND LENGTH OF HOSPITAL STAY AFTER EXTREMITY AMPUTATION: A TWO-CENTRE STUDY IN SOUTHERN NIGERIA

Furo Orupabo[1], Mike Tochi Achor[2]*

Correspondence: Mike Tochi Achor **Email:** miketochi.Achor@ust.edu.ng

Abstract

Background: Extremity amputations are commonly encountered in orthopaedic practice. The surgery is often associated with complications leading to prolonged hospitalization, additional procedures and economic burden. Earlier studies in the region focused more on the indications and other variables. There are limited data on the length of hospital stay and the complications.

Objective: This study aimed to evaluate the complications, and the length of hospital stay after extremity amputations.

Methods: The study was a descriptive retrospective study, spanning a period of 5 years. Records of patients whose information met the inclusion criteria were utilized in the study. Their information was obtained from the records of two tertiary hospitals and analysed using SPSS version 26.

Results: Records of 216 patients were utilized in this study. The mean age was 48.98±19.85 years with male to female ratio of 1.4:1. Thirty-six patients (16.7%) had complications with wound infection being the most predominant (10.2%; n=22). The mean length of hospital stay was 34.13±17.67 days with most patients (42.6%; n=92) staying between 30 - 60 days. There was statistically significant association between length of hospital stay and the complications (P= 0.0001) as well as the indications (P=0.0001).

Conclusions: The result showed prolonged length of hospital stay after extremity amputation. This correlates with the complications and the indications.

Keywords: Complications, Length of hospital stay, Extremity amputation, Nigeria

Cite *as: Orupabo F, Achor MT. Complications and length of hospital stay after extremity amputation: a two-centre study in southern Nigeria. AJRMHS. 2026; 4(1):1-10*

Introduction

Amputation is the surgical removal of whole or part of a limb through a bone cut. When same procedure is performed through a joint, the term, disarticulation is often used. It is a life-saving procedure that imposes significant functional, economic and social limitation to the patient. Surgical amputation is an old art that dates back to the era of Hippocrates.[1] Techniques were initially rapid cuts with attendant high mortality due to haemorrhage and infection. However, the procedure has evolved to refined and sterile surgeries in the modern era. Severe injuries from wars were the main indications in the olden days. In recent years, the indications have evolved to include malignancies, infective conditions, peripheral vascular diseases, congenital abnormalities as well as painful and functionless limbs that constitute a nuisance to the patient.[2] In the Western world, peripheral vascular diseases are the commonest indication for lower limb amputations.[3,4,5] In developing countries like Nigeria, there is high prevalence of diabetic gangrene [6,7] as the leading cause in the Southern part. In the Northern and Western Nigeria however, trauma and malignant tumours predominate. [8,9,10] A retrospective review of 93 lower limb amputations in 93 patients in Eastern Nigeria, showed that diabetic foot gangrene was the commonest indication.[11]

Extremity amputation is classified as major or minor. Major limb amputation is defined as the ablation of the limb proximal to the wrist (for upper limb amputation) or proximal to the ankle (for lower limb amputation).[11] Major amputations are more prone to economic and functional limitations especially in the poor resource environment due unaffordability of prosthetic rehabilitation. [6,7,8]

The complications of amputation may be classified as local or systemic. The local complications include wound infection, flap necrosis, stump osteomyelitis, stump overgrowth (in children), muscle wasting, joint contractures among others. The systemic complications include thromboembolism, phantom limb pain, and psychological problems like depression, anxiety and post-traumatic stress disorder (PTSD). They may also be classified as early (e.g. haemorrhage) or late (e.g. joint contracture). A two-centre study in Cameroon [15] and another in Nigeria [16] reported wound infection as the commonest complication, followed by phantom limb pain. The duration of hospital stay after amputation may be influenced by the level (site of amputation), complications and co-morbidities. A study of 11,205 patients from Danish registry[17] reported mean length of hospital stay (LOS) of 19 days for transtibial amputations and 13 days for transfemoral amputations. A nationwide study carried out in England[18] reported a median LOS of 21-28 days after major lower extremity amputation (MLEA). The duration was longer in patients that had above knee amputations and those with diabetes mellitus.

Most studies in Nigeria have focused on the indications and complications of amputations. However, there is paucity of data on length of hospital stay. The aim of this study is to determine the complications and length of hospital stay after extremity amputations in Port Harcourt, Southern Nigeria.

Materials And Methods

Study Area: The study was carried out at the Rivers State University Teaching Hospital (RSUTH) and the University of Port Harcourt Teaching Hospital (UPTH), both in Port Harcourt, Rivers State, Nigeria. These two centres handle the bulk of amputation cases in Rivers State.

Data Sources: The data were collected at the orthopaedic clinics, wards, theatre and accident/emergency departments of RSUTH and UPTH.

Research Design: This was a retrospective descriptive study spanning a period of 5years.

Study Population: Records of patients who presented to the orthopaedic surgeons between 1st January 2020 to 31st December 2024 and met the inclusion criteria constituted the study population.

Inclusion and Exclusion Criteria: The study included records of patients who had amputation by the orthopaedic surgeons at RSUTH and UPTH between January 2020 to December 2024 and followed up for at least six months. The study period was August 2025 to January 2026. The eligible

medical records were those of patients with complete information. These data were collected manually using a proforma validated by the authors. Excluded from this study were patients with incomplete medical records.

Study Variables of Interest: Secondary data from patients who met the inclusion criteria were utilized for the study. Data retrieved from patients' folders include: biodata, indication for amputation, level of amputation, length of hospital stay, and complications.
Treatment notes, follow up notes and physiotherapy notes were also retrieved and analysed.

Ethical Consideration: Ethical approval was obtained from ethics committee of the hospitals. Consent from the patients were waived due to retrospective nature of the study. However, their personal information was kept anonymous.

Validity/Reliability of Instrument: The data were scrutinized by the authors for authenticity before usage.

Data Analysis: Data collated were analysed using Statistical Package for Social Sciences (SPSS) version 26. The results were presented in tables and bar charts and variables expressed as mean, proportion, and standard deviation

RESULTS

Records of 251 patients were initially retrieved, but only that of 216 patients had complete information and hence utilized in this study. These 216 patients also had 216 amputations in various sites of their extremities. The mean age was 48.98 ± 19.85 years, with a median age of 50.5 years (age range: 5 – 100 years). Patients aged 51– 60 years constituted the largest age group (n=41;19.0%), followed by those aged 41 – 50 years (n=40;18.5%). The age group <10 years was the least (n=18;8.3%). There were 126 males (58.3%) and 90 females (41.7%) giving a male-to-female ratio of 1.4:1. Majority of the patients (n=101;46.8%) had secondary education, while 17.6% (n=38) had no formal or only primary education (table I).

Table I: Socio-demographic characteristics of patients

Variables	Frequency (216)	Percentage (%)
Age category		
≤10 years	18	8.3
21 – 30 years	24	11.1
31 – 40 years	30	13.9
41 – 50 years	40	18.5
51 – 60 years	41	19.0
61 – 70 years	33	15.3
>70	30	13.9
Mean ± SD	*48.98±19.85years;*	
Median (range)	*50.5 (5–100) years*	
Gender		
Male	126	58.3
Female	90	41.7
Male-to-female ratio	*1.4:1*	
Level of education attained		
None/Primary	38	17.6
Secondary	101	46.8
Tertiary	77	35.6

SD – Standard deviation

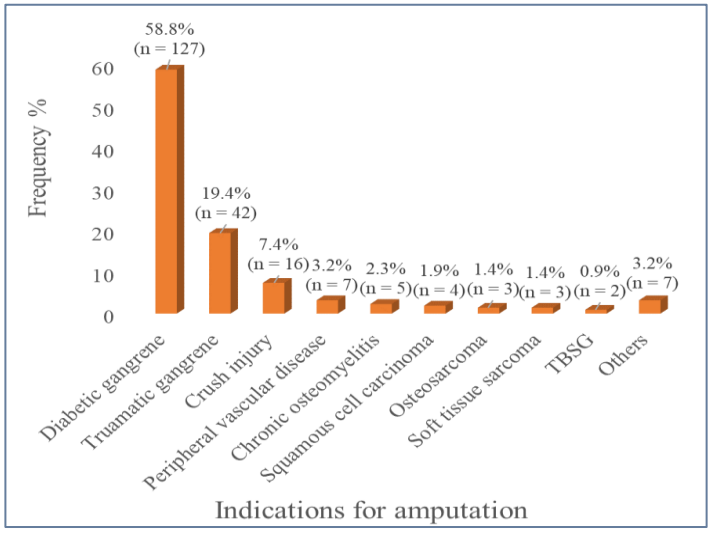

Figure 1: **Indications for Amputation**

Note: *Others include Chronic leg ulcer (0.5%, n = 1), Failed limb reconstruction (0.5%; n = 1), Giant cell tumour (0.5%; n = 1), Gunshot injury (0.5%; n = 1), burns (0.5; n = 1), Pseudo-aneurysm of the femoral artery (0.5%; n = 1), Synovial sarcoma (0.5%; n = 1)*

As shown in figure 1, the most common indication for amputation was diabetic gangrene (58.8%; n = 127 of all cases). This was followed by traumatic gangrene (19.4%; n = 42).

Table II: Site/level of Amputation

Variables	Frequency (216)	Percentage (%)
Below knee	103	47.7
Above knee	74	34.3
Below elbow	12	5.6
Above elbow	13	6.0
Disarticulation (toe/wrist/digits)	5	2.3
Ray amputation	3	1.4
Syme amputation	3	1.4
Others	3	1.4
Total	**216**	**100.0**

The most common site of amputation was below the knee (47.7% cases; n = 103). This was followed by above-knee amputations, which represented 34.3% (n = 74). Upper-limb amputations were less frequent, comprising below-elbow procedures (5.6% cases; n = 12) and above-elbow amputations (6.0% of the patients; n = 13). The least site of amputation was tagged others in table II and collectively accounted for 1.4% (n=3) of the cases; This category included trans-radial amputation (0.5%; n = 1), trans-metatarsal amputation and trans-metacarpal amputations (0.5%; n = 1).

The mean length of hospital stay was 34.13±17.67 days. Most of the patients (42.6%; n=92) had length of hospital stay between 30 to 60 days (figure 2).

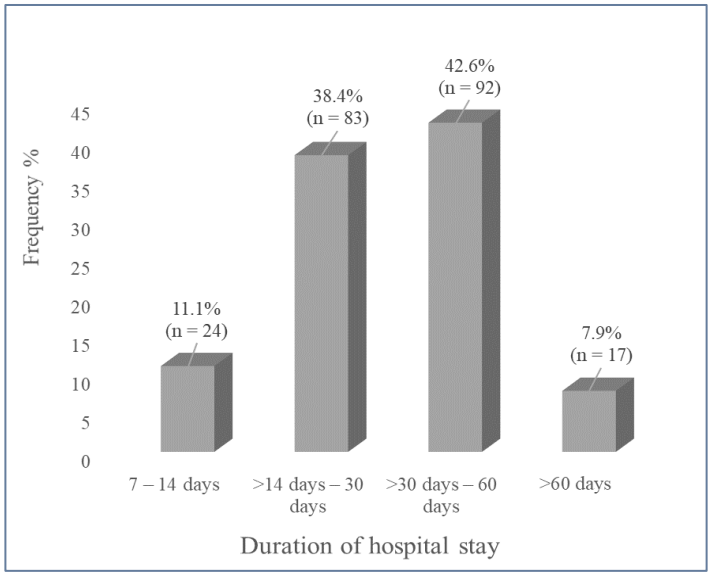

Figure 2: Length of hospital stay

Table III: Post-operative Complications/Outcome

Variables	Frequency (n)	Percentage (%)
Complications		
Yes	36	16.7
No	180	83.3
Type of complication (n = 36)		
Wound infection	22	10.2
Depression	6	2.8
Phantom limb pain	6	2.8
Flap necrosis	2	0.9
Outcome		
Discharged	214	99.1
Died	2	0.9

Thirty-six patients (16.7%) had complications, while majority (n=180; 83.3%) had none. Among those who experienced complications, wound infection was the most common (n=22;10.2%). Majority of the patients (99.1%; n=214) were successfully discharged, while 2 (0.9%) died on admission.

Table IV: Indication for amputation and length of hospital stay

Indications for amputation	Length of hospital stay				Total
	7 – 14 days n (%)	>14 – 30 days n (%)	>30 – 60 days n (%)	>60 days n (%)	n (%)
Diabetic gangrene	3 (2.4)	37 (29.1)	74 (58.3)	13 (10.2	127 (100.0)
Traumatic gangrene	16 (38.1)	21 (50.0)	5 (11.9)	0 (0.0)	42 (10.0)
Crush injury	4 (25.0)	7 (43.8)	5 (31.2)	0 (0.0)	16 (100.0)
Peripheral vascular disease	0 (0.0)	1 (14.3)	4 (57.1)	2 (28.6)	7 (100.0)
Chronic osteomyelitis	0 (0.0)	5 (100.0)	0 (0.0)	0 (0.0)	5 (100.0)
Squamous cell carcinoma	0 (0.0)	2 (50.0)	2 (50.0)	0 (0.0)	4 (100.0)
Osteosarcoma	0 (0.0)	2 (66.7)	0 (0.0)	1 (33.3)	3 (100.0)
Soft tissue sarcoma	0 (0.0)	2 (66.7)	1 (33.3)	0 (0.0)	3 (100.0)
TBSG	0 9).0)	1 (50.0)	0 (0.0)	1 (50.0)	2 (100.0)
Others	1 (14.3)	5 (71.4)	1 (14.3)	0 (0.0)	7 (100.0)
Total	**1 (14.3)**	**83 (38.4)**	**92 (42.6)**	**17 7.9)**	**216 (100.0)**

Chi Square = 96.539, p-value = 0.0001* *Statistically significant ($p<0.05$)

Table V: Complications and length of hospital stay

Type of complication	Length of hospital stay				Total
	7 – 14 days n (%)	>14 – 30 days n (%)	>30 – 60 days n (%)	>60 days n (%)	n (%)
Wound infection	0 (0.0)	0 (0.0)	12 (54.5)	10 (45.5)	22 (100.0)
Depression	0 (0.0)	0 (0.0)	6 (100.0)	0 (0.0)	6 (100.0)
Phantom limb pain	2 (33.3)	3 (50.0)	1 (16.7)	0 (0.0)	6 (100.0)
Flap necrosis	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	2 (100.0)
Total	2 (5.6)	3 (8.3)	19 (52.8)	12 (33.3)	36 (100.0)

Fisher's exact test = 26.313, p-value = 0.0001* *Statistically significant ($p<0.05$)

Table IV showed that there was a statistically significant association between the indication for amputation and the duration of hospital stay (Chi Square = 96.539, p = 0.0001). Patients with diabetic gangrene showed the longest duration of hospital stay, with 58.3% (n=74) staying more than 30 – 60days and 10.2% over 60 days. In contrast, patients with traumatic gangrene had markedly shorter stays with 38.1% (n=16) discharged within 7 – 14 days.

As shown in table V, there was a statistically significant association between the type of postoperative complication and the length of hospital stay (Fisher's exact test = 26.313, p = 0.0001). Patients with wound infection had prolonged hospitalizations, with 54.5% staying >30 – 60 days. The remaining 45.5% stayed >60 days. All patients (100%) who developed depression stayed >30 – 60 days (100%). Patients with flap necrosis had the longest hospital stay, as 100% were hospitalized for more than 60 days.

As shown in table VI above, there was a statistically significant association between the indication for amputation and the type of postoperative complication observed among the patients (Fisher's exact test = 31.061, p = 0.004).

Among patients amputated for diabetic gangrene, wound infection was the most common complication (72.0%; n=18). Half of the complications observed in those with traumatic gangrene was phantom pain (50.0%; n=2). All patients whose indications for amputations were crush injury and chronic osteomyelitis developed phantom pain as the sole complication. Patients with peripheral vascular disease only experienced wound infection (100.0%; n=2), while the single case of osteosarcoma had flap necrosis (100.0%; n=1).

Table VI: Indications for amputation and type of complication patients had

	Type of complication				
Indications for amputation	**Wound Infection n (%)**	**Depression n (%)**	**Phantom pain n (%)**	**Flap necrosis n (%)**	**Total n (%)**
Diabetic gangrene	18 (72.0)	5 (20.0)	1 (4.0)	1 (4.0)	25 (100.0)
Traumatic gangrene	2 (50.0)	0 (0.0)	2 (50.0)	0 (0.0)	4 (100.0)
Crush injury	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	2 (100.0)
Peripheral vascular disease	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)
Chronic osteomyelitis	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)
Osteosarcoma	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)
Others	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)
Total	22 (61.1)	6 (16.7)	6 (16.7)	2 (5.6)	36 (100.0)

Fisher's exact test = 31.061, p-value = 0.004* *Statistically significant ($p<0.05$)

DISCUSSION

Amputation poses major health challenges, especially in the developing world with limited resources for patients' rehabilitation. The indications and complications vary from one region to another as well as within regions. The present study highlights the indications, complication and length of hospital stay. The predominant age group in this study was 51-60 years (19%; n=41) followed by the age bracket 41-50 years (18.5%; n=40) with a mean of 48.98±19.85years. This may be related to co-morbidities associated with increasing age. The high preponderance of patients in 4th to 6th decades compares well with that of other studies. [19,20,21] but differs from that reported in a Cameroonian study.[22] This difference may be explained by the varying pathology (indication) leading to the amputation. The male category predominated with male to female ratio of 1.4:1. The high preponderance of male patients are in keeping with that of other studies. [15,16,20,23] Majority of the patients had secondary education (46.8%) followed by tertiary education (35.6%). The impact of this on health-seeking behaviour and compliance to rehabilitation protocol is subject to future investigation.

The most common indication for amputation in this study was diabetic gangrene (58.8%), followed by trauma-related cases (27.7%). These trauma-related indications comprise of traumatic gangrene (19.4%), crush injuries (7.4%) and traditional bone setter's gangrene (0.9%) as shown in figure 1. Traditional bone setter's gangrene (TBSG) is the sequelae of compartment syndrome and tissue death arising from tight splints used in treatment by native healers.[24] Peripheral vascular disease was 3rd on the list (3.2%). This trend is similar to the findings of other authors. [15,20,21.25,26] Earlier studies reported that diabetic gangrene was the commonest indication for amputation in Southern Nigeria, [6,7,11] while trauma and tumours dominate in the Northern and Western regions. [8,9,10,] In the Western world, peripheral vascular diseases are the commonest indication. [3,4,5] A study in Kano,[16] identified traditional bone setter's gangrene as the second most common indication, after other trauma related causes.

The most frequently performed procedure in this study was below knee amputation (47.7%; n=103), followed by above knee ablation (34.3%; n=74). Amputations at lower levels were less frequent (digital disarticulation 2.3%, ray amputation 1.4%). This may be related to late presentation with attendant progressive gangrene. It may also be due to high preponderance of diabetic cases in our study as the pathology spreads fast and the affected patients rarely do well with amputations at lower levels. Our finding compares well with that of other Nigerian studies [16,27] as well as a study in Cameroon[15] and another in Rwanda.[23] Our finding differs from that of Alegbeleye, [22] who reported above knee amputation as the most common procedure.

The mean length of hospital stay (LOS) in our study was 34.13±17.67 days. This is higher than that reported in a Danish[17] and English[18] studies. This difference may be related to the quality of medical services between developed and the developing countries. It may also be related to the structure/pattern of care as some services are continued in Nursing Homes post discharge in those countries. This was noted in the Danish study.[17] The observed LOS in our study was correlated with the indications and the observed complications. There was statistically significant association between LOS and the indications for amputation (P= 0.00001). Those with diabetic gangrene had the longest LOS, with majority (58.3%; n= 74) staying >30-60 days. Patients with trauma had the least LOS, with 50% (n=21) spending between 14 and 30 days. There was also statistically significant association between the length of hospital stay and the observed complications (P= 0.00001). All patients with depression had LOS of >30-60 days. All with flap necrosis had LOS of >60 days (table V). These may be related to time required for medical rehabilitation (in case of the former) and infection control plus soft tissue reconstruction (in case of the latter).

The complication rate 16.7% is less than that reported in earlier Nigerian studies.[16,28,29] This difference may be related to better understanding and improved quality of care as those other studies were carried out decades ago.

The commonest complication was wound infection (10.2%), which is in agreement with other studies.[16,28,29]. Wound infection was expectedly higher in those whose amputations were secondary to diabetic gangrene. This may be explained by immune dysfunction and neurovascular compromise associated with diabetes mellitus. Phantom limb pain and depression were each responsible for 2.8% (n=6 each) of the complications. The observed phantom pain is much lower than that reported in other studies.[16,30] This difference may be related to under reporting due to retrospective nature of this study. It could also be that only early-onset phantom limb pains were documented as some may have started post discharge. Depressive illnesses are not unusual amongst amputees due to functional limitation and economic loss associated with the procedure. The relationship between depression and economic loss as well as availability/affordability of prosthesis is subject to future studies.

The in-hospital mortality rate in this study was 0.9%. The two patients died of severe sepsis from late presentation of diabetic gangrene. The observed mortality is higher than that reported by another Nigerian study[16]. This difference may be due to lower representation of diabetes-related cases in the latter study.

LIMITATIONS OF THE STUDY

The limitations of this study include lack of data on the duration of symptoms prior to presentation, treatment given before presentation, physical frailty, Body Mass Index (BMI) and lifestyle like smoking which may adversely affect wound healing and hence may constitute confounding factors on LOS. In addition, the study did not differentiate LOS associated with surgical complications and those related to medical conditions as well as readmissions post discharge.

CONCLUSION

Wound infection is the commonest complication of extremity amputation observed in this study. Diabetic gangrene was largely responsible for this. The mean length of hospital stay was 34.13±17.67 days. The economic loss associated with this prolonged hospital stay and its impact on health care financing is subject for future studies.

Therefore, we recommend a prospective study that will evaluate the relationship between length of hospital stay and cost of healthcare as well as readmission risks for patients who had undergone extremity amputation. Such study should strive to distinguish between length of stay/readmission associated with surgical problems and those related to medical co-morbidities.

OTHER INFORMATION

Funding: The study was funded by the authors.

Conflict of Interest: The authors declare none.

Acknowledgement: We acknowledge the records departments of University of Port Harcourt Teaching Hospital and the Rivers State University Teaching hospital for making the required patients' records available to us.

REFERENCES

1. Hemigou P. Amboise Pare II: Pare's contribution to amputation and ligature. Int Orthop. 2013;34:769-72.

2. Mihalko MjAzar FM, Beaty JH, Canale ST. Amputations of the lower extremity Campbell's Operative Orthopaedics. E-book. 2016; 113th Philadelphia PA Elsevier Inc.:647.85 Part VI, Chapt.16

3. Boyko EJ, Monteiro-Soares M, Wheeler SGBCowie CC, Cassagrande SS, Menke A, et al. Peripheral arterial disease foot ulcers lower extremity amputations and diabetes. Diabetes in America. 2017 3rd (17-1468) Bethesda MD National Institute of Health, NIH Pub Chap 20.

4. Gabel J, Jabo B, Patel S, Kiang S, Bianchi C, Chiriano J, et al. Vascular Quality Initiative. Analysis of Patients Undergoing Major Lower Extremity Amputation in the Vascular Quality Initiative. Ann Vasc Surg. 2018 Jan; 46:75-82. doi:10.1016/j.avsg.2017.07.034. Epub 2017 Sep 6. PMID: 28887250.

5. Moxey PW, Gogalniceanu P, Hinchlife RJ, Loftus IM, Jones KJ, Thompson MM, et al. Lower extremity amputations-a review of global variability in incidence. Diabet Med. 2011; 28:1144-53

6. Dada AA, Awoyomi BO. Is the trend of amputations in Nigeria changing? A review of 51 consecutive cases seen at Federal Medical Centre Ebute Metta Lagos Nigeria. Nig Med J. 2010; 51: 167-9

7. Ndukwu CU, Muoneme CA. Prevalence and pattern of major extremity amputations in a tertiary hospital in Nnewi South East Nigeria. Trop J Med Res. 2015; 18: 104-8

8. Omoke NI, Nwigwe CG. Limb amputations in Abakikliki South East Nigeria. Afr J Med Sci. 2016; 15:30-5

9. Dabkana TM, Nyaku FT, Bwala FT. Current indications for extremity amputations in Maiduguri, North-East Nigeria: A 6-year retrospective review. Ann Afr Med. 2018 Jan-Mar; 17(1): 22-25. Doi: 10.4103/aam.aam_40_17. PMID: 29363632; PMCID: PMC5810089.

10. Salawu ON, Babalola OM, Mejabi JO, Fadimu AA, Ahmed BA, Ibraheem GH, et al. Major extremity amputations: Indications and post-surgery challenges in a Nigeria tertiary institution. Sahel Med J. 2019; 22:8-12

11. Onwuasoigwe O, Okwesili IC, Onyebulu LO, Nnadi EC, Nwosu AD. Lower Limb Amputations in Nigeria: An Appraisal of the indications and Patterns from a Premier Teaching Hospital. International Journal of Medicine and Health Development. 2021; 26(1):64-69. doi: 10.4103/ijmh.IJMH_47_20

12. Yinusa, Ugbeye ME. Problems of amputation surgery in a developing country. Int Orthop. 2003;27(2):121-4. doi: 10.1007/s00264-002-0421-x. Epub 2003 Jan 23. PMID: 12700939; PMICD: PMC3460656.

13. Kim YC, Park CI, Kim DY, Kim TS, Shin JC. Statistical analysis of amputations and trends in Korea. Prosthet Orthot Int. 1996Aug;20 (2):88-95. Doi:10.3109/03093649609164424. PMID:8876001.

14. Omoke NI, Nwigwe CG. Limb amputations in Abakiliki South East Nigeria. Afri J Med Sci. 2016;15:30-5.

15. Tamfu NS, Gustave TG, Ngeh EN, Kwijirba NB, Christopher PT. Indications and complications of lower extremity amputations in two tertiary hospitals in the North West Region of Cameroon. Pan African Medical Journal. 2023;44:196. doi: 10.11604/pamj.2023.44.196.34969.

16. Ajibade A, Akinniyi OT, Okoye CS. Indications and Complications of Major Limb Amputations in Kano. Nigeria. Ghana Med J. 2013 Dec;47(4):185-188.

17. Brix AT, Rubin KH, Nymark T, Schmal H, Lindberg-Larsen M. Length of hospital stay and readmissions after major lower extremity amputation: a Danish nationwide registry study. Acta Orthop. 2024 Dec 23;95:737-743. doi: 10.2340/17453674.2024.42637.

18. Moxey PW, Hofman D, Hinchliffe RJ, Poloniecki J, Loftus IM, Thompson MM, et al. Delay influences outcome after lower limb major amputation, Eur J Vasc Endovasc Surg. 2012; 44(5): 485-90. Doi: 10.1016.j.ejvs.2012.08.003.

19. Jawaid M, Ali I, Khaimkhani GM. Current indications for major lower limb amputations at Civil Hospital, Karachi. Pk J Surg. 2008; 24(4)228-231.

20. Chalya PL, Mabula JB, Dass RM, Ngayomela IH, Chandika AB, Mbelenge N *et al.* Major limb amputations: a tertiary hospital experience in northwestern Tanzania. J Orthop Surg. 2012; 7:18.

21. Ofiaeli R. Indications level and outcome of lower extremity amputations in Nnewi, Nigeria. J Med Investig Pract. 2001; 2(1): 18-21.

22. Alegbeleye BJ. Major limb amputations: a tertiary hospital experience in Northwestern Cameroon. Health Sci Dis. 2020; 21(2):8.

23. Murwanashyaka E, Ssebuufu R, Kyamanywa P. Prevalence, indications, levels and outcome limb amputations at University Teaching Hospital: Butare in Rwanda. East Cent Afr J Surg. 2013;18(2):103-107.

24. Onumiya JE, Onobowale BO, Obekpa PO, Ihezue CH. Traditional bone setter's gangrene. Int Orthop. 1999; 23(2):111-2.

25. Pohjolainen T, Alaranta H. Epidemiology of lower limb amputees in Southern Finland in 1995 and trends since 1984. Prosthet Orthot Int. 1999; 23(2):88-92.

26. Muyembe V, Muhinga M. Major limb amputation at a provincial general hospital in Kenya. East Afri Med J. 1999; 76(3): 163-166.

27. Uchenna KA, Ndubuisi D, Somtochukwu K. Major limb amputations: a 5year retrospective study in a regional trauma centre. Niger J Med. 2018;27(3):277-281. https://doi.org/10.4314/njm.v27i3.

28. Kidmas AT, Nwadiaro CH, Igun GO. Lower imb amputation in Jos, Nigeria. East Afri Med J. 2004;81(8):427-429. doi: 10.4314/eamj.v81i8.9205.

29. Akiode OA, Shonubi OS, Musa A, Sule G. Major limb amputations: An audit of indications in a suburban surgical practice. J Natl Med Assoc. 2005;97(1): 74-78.

30. Kooijman CM, Dikkstra PU, Geertzen JH, Elzinga A, van der Schans CP. Phantom pain and phantom sensations in upper limb amputee: an epidemiological study. Pain. 2000;87(1):33-41. doi:10.1016/S0304-3959(00)00264-5.

Date Submitted: March 15, 2026

Date Accepted: March 29, 2026

Date Published: 31st July 2026

Author affiliations and ORCIDs

[1]Department of Surgery, Faculty of Clinical Sciences, College of Health Sciences, University of Port Harcourt, Port Harcourt, Nigeria. Email: Furo.Orupabo@uniport.edu.ng. ORCID ID: https://orcid.org/0000-0002-3330-9405

[2]Department of Surgery, Faculty of Clinical Sciences, College of Medical Sciences, Rivers State University, Port Harcourt, Nigeria. Email: Miketochi.Achor@ust.edu.ng. ORCID ID: https://orcid.org/0009-0007-9686-4709