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Original Research Article

Geriatic lower limb amputations in a tertiary health centre in Southwestern Nigeria: a 5-year retrospective cohort study

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ABSTRACT

Background: Amputation in the geriatric population is a significant health concern with overmastering implications for individual well-being, healthcare systems, and societal resources. The aim was to review all geriatric patients who had lower limb amputation over a 5-year period.
Methods: Retrospective cohort study which examined 54 elderly patients aged 65 years and older who underwent lower limb amputation in a 5year period. Data on demographics, clinical characteristics, and surgical details were extracted from medical records.
Results: The mean age of patients was 73.9 years, with 61.1% between 65-74 years old. There was an equal distribution of males and females. The left lower limb was more commonly affected (53.7%) than the right (44.4%). Diabetic foot was the leading cause of amputation (66.7%), followed by peripheral arterial disease (31.5%).
Conclusions: This study highlights the significant impact of diabetes and peripheral arterial disease on lower limb amputations in the elderly population. The findings underscore the need for targeted interventions in diabetes management and vascular health to reduce amputation risk. Further research is warranted to investigate the slight predominance of left lower limb amputations and to develop strategies for improving outcomes in this vulnerable population.

Keywords: Amputations, Geriatric, Lower limb

INTRODUCTION

Amputation in the elderly population is a significant health concern with profound implications for individual well-being, healthcare systems, and societal resources. As global demographics shift towards an aging population, understanding the characteristics, outcomes, and challenges associated with elderly individuals undergoing amputation becomes increasingly crucial.[1,2] This study aims to provide a comprehensive analysis of the demographic and clinical features of elderly patients who have undergone lower limb amputation, offering valuable insights for healthcare providers, policymakers, and researchers in the field of geriatric care and rehabilitation.

Lower limb amputation in older adults is often the result of complex, interrelated factors. Chronic conditions such as diabetes mellitus, peripheral vascular disease, and atherosclerosis are primary contributors, frequently compounded by age-related physiological changes that impair wound healing and circulation[3,4] Trauma, though less common, remains a significant cause of amputation in this age group, often resulting from falls or accidents.[5]

The decision to proceed with amputation in elderly patients is multifaceted, requiring careful consideration of the individual's overall health status, potential for rehabilitation, cognitive function, social support, and quality of life expectations.[6] The impact of lower limb amputation on elderly individuals extends far beyond the immediate surgical intervention. It often leads to decreased mobility, increased dependence on caregivers, and a higher risk of mortality.[7] Moreover, the psychological effects, including depression, anxiety, and body image issues, can be profound and long-lasting. Understanding these impacts is crucial for developing comprehensive care plans and support systems for elderly amputees.

This study aims to provide a comprehensive analysis of the demographic and etiological factors of elderly patients who have undergone lower limb amputation, offering valuable insights for healthcare providers, policymakers, and researchers in the field of geriatric care and rehabilitation.

By delving into these aspects, this study aims to provide a nuanced understanding of lower limb amputation in the elderly. The findings have potential implications for improving preoperative assessment, surgical planning, postoperative care, and long-term rehabilitation strategies. Additionally, this research may highlight areas where targeted interventions could reduce the need for amputation or improve outcomes for elderly individuals who undergo this procedure. As the global population continues to age, healthcare systems worldwide face the challenge of providing effective, compassionate care for elderly individuals with complex medical needs. This study's insights into lower limb amputation in the elderly contribute to the broader discourse on geriatric healthcare, potentially informing policy decisions, resource allocation, and the development of specialized care protocols for this vulnerable population.

METHODS

This research employed a retrospective, observational study design. The study was conducted at university college hospital Ibadan, a highly specialized tertiary care center with orthopedic department. The study period spanned from 2018 to 2023.

The study included 54 elderly patients who underwent lower limb amputation during the specified period with the following inclusion criteria 65 years or older at the time of amputation having undergone a lower limb amputation procedure (including partial foot, below-knee, or above-knee amputation) and complete medical records available for review.

Patients were excluded from the study if they were under 65 years of age at the time of amputation. Cases with incomplete or missing medical records were also excluded from the analysis. Additionally, patients who underwent upper limb amputations or those who had amputations performed at other healthcare facilities were not included in the study cohort. This careful selection process ensured that the analyzed data accurately represented the target population of elderly patients undergoing lower limb amputation at the university college hospital during the study period.

Data were extracted from medical records and patient files included demographic data, clinical characteristics and surgical details of amputation.

The study protocol was reviewed and approved by University College Hospital's ethical review board Committee. Given the retrospective nature of the study, the requirement for individual patient consent was waived. All data were de-identified to protect patient confidentiality, and the study was conducted in accordance with the Declaration of Helsinki.

Statistical analysis was performed using SPSS. Descriptive statistics were used to summarize the data. Categorical variables (e.g., sex, affected limb, diagnosis) were presented as frequencies and percentages. Continuous variables (e.g., age) were described using means and standard deviations, as well as ranges.

RESULTS

The study included 54 elderly individuals who underwent amputation between 2018 to 2023. The majority (61.1%) were between 65-74 years old, with a mean age of 73.9 years as shown Table 1.

Table 1: Demographic characteristics of elderly with amputation (n=54).

Variables	Items	Frequency	Percentage
Age group (years)	65-74	33	61.1
	75-84	14	25.9
	85-94	6	11.1
	105-114	1	1.9
Mean±SD [range]	73.9±9.3	[65-110.0]	

There was an equal distribution of males and females (50% each) in the study (Table 2). This indicates that gender may not be a significant factor in amputation risk for the elderly.

Table 2: Sex distribution.

Sex	Frequency	Percentage
Male	27	50.0
Female	27	50.0
Total	54	100.0

The left lower limb was slightly more affected (53.7%) compared to the right lower limb (44.4%). Only one case (1.9%) involved both limbs. This slight difference might

be coincidental or could warrant further investigation into potential causes as shown in Figure 3.

The most common diagnosis leading to amputation was Diabetic Foot (DMF) at 66.7%, followed by peripheral arterial disease at 31.5% as shown in Figure 1. This highlights the significant impact of diabetes on lower limb health in the elderly population. Notably, all the patients had regional anesthesia and this could have contributed immensely to the patient outcomes and recovery. The study apparently looked at different types of amputation surgeries. This information could be valuable in understanding the severity and extent of the conditions leading to amputation (Figure 1).

The distribution of underlying causes was examined, which likely correlates with the diagnoses mentioned in (Figure 2).

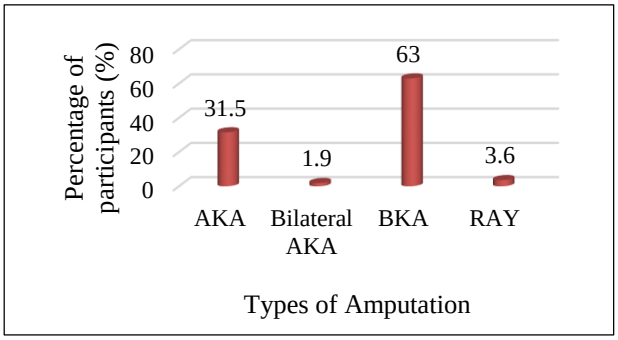

Figure 1: Types of amputations.

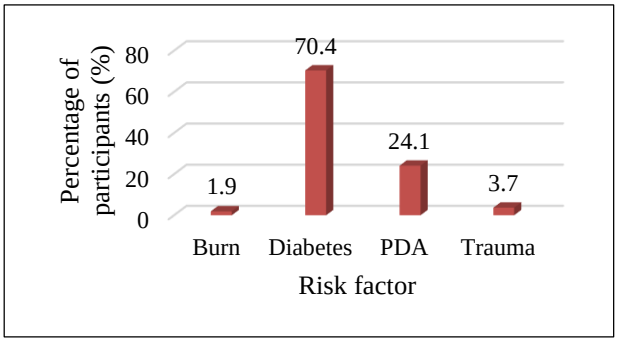

Figure 2: Risk factors.

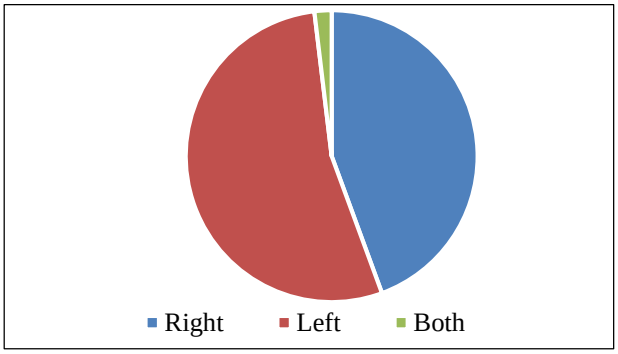

Figure 3: Affected lower limb.

DISCUSSION

The demographic analysis revealed that a significant proportion (61.1%) of the patients were aged between 65-74 years, with a mean age of 73.9 years. This is consistent with other studies that show a higher incidence of amputations in the older population due to age-related comorbidities and the cumulative impact of chronic diseases.[8] The equal distribution of males and females (50% each) suggests that gender may not be a significant factor in the risk of amputation among the elderly, which aligns with findings from other similar cohorts.[9] Although, some previous research has shown mixed results regarding gender differences in amputation risk, with some studies indicating higher rates in males due to factors such as higher smoking prevalence and occupational hazards.[9] The equal distribution observed in this cohort suggests that other factors, such as diabetes and peripheral arterial disease, may play a more dominant role in this population, overshadowing gender-related risks.

The study found a slightly higher incidence of left lower limb amputations (53.7%) compared to the right (44.4%), with only 1.9% involving both limbs. While the difference might appear minor, it could suggest underlying factors that predispose one limb to a higher risk of complications leading to amputation. Previous research indicates that factors such as vascular anomalies or dominance of one limb over the other could play a role.[10] Further investigation into this aspect could uncover specific risk factors or anatomical predispositions. The predominance of Diabetic Foot (DMF) as the leading cause of amputation (66.7%), followed by peripheral vascular disease (31.5%), highlights the critical role of diabetes in the etiology of lower limb amputations. Diabetes mellitus is well-documented as a major risk factor for peripheral vascular disease and subsequent limb ischemia, leading to complications that often necessitate amputation.[11] The high prevalence of DMF in this cohort underscores the need for effective diabetes management programs, particularly in the elderly who are more vulnerable to its complications.

Diabetes neuropathy, peripheral vascular disease, and impaired wound healing are other attendant complications in diabetic patients leading to severe foot ulcers and infections.[12] Interventions such as regular foot examinations, patient education, and timely treatment of foot ulcers are crucial in reducing the incidence of amputations in the elderly.[12]

Peripheral vascular disease (PVA), accounting for 31.5% of the cases, is another significant cause of amputations. PVA often results from atherosclerosis, leading to reduced blood flow to the extremities and causing critical limb ischemia, which can progress to gangrene if untreated.[13] The high incidence of PVA-related amputations in this cohort indicates the need for improved vascular health management and preventive measures to address atherosclerosis and its complications.

The study notes that all our patients had spinal. The choice of anesthesia can significantly impact patient outcomes, including perioperative morbidity and mortality, especially in the elderly who may have multiple comorbidities.[14] Regional anesthesia, for instance, has been associated with better outcomes compared to general anesthesia in some studies, highlighting the importance of tailored anesthetic approaches.[15]

Different types of amputation surgeries performed could provide valuable insights into the severity and extent of conditions leading to amputations. Below-knee, and above-knee amputations have varying implications for patient mobility, rehabilitation, and quality of life. The choice of amputation level often depends on the extent of disease and the viability of the remaining limb tissue.[16] Understanding the distribution and outcomes of these surgeries can inform clinical decision-making and rehabilitation planning.

The findings from this study have several implications for clinical practice. First, there is a clear need for targeted diabetes management programs to reduce the incidence of DMF and subsequent amputations. This includes patient education, regular foot care, and early intervention for foot ulcers. Secondly, improving vascular health through lifestyle modifications, medication management, and possibly surgical interventions for peripheral vascular disease can help reduce the risk of gangrene and amputations. More so, the choice of anesthesia and surgical techniques should be carefully considered, with a preference for approaches that minimize perioperative risks and enhance recovery.

The study opens several avenues for future research. Investigating the reasons behind the slight predominance of left lower limb amputations could provide new insights into anatomical or physiological factors influencing amputation risk. Likewise, research into the impact of different types of anesthesia on outcomes in elderly patients undergoing amputation can inform best practices in surgical management. Longitudinal studies examining the long-term outcomes and quality of life of elderly amputees are also needed to guide rehabilitation and support services.

The retrospective nature of this study limits the ability to establish causal relationships. The single-center design may affect the ability to generalize the findings to other settings or populations.

CONCLUSION

The impact of diabetes and peripheral vascular disease on lower limb amputations in the elderly cannot be ignored. Targeted clinical interventions, tailored surgical approaches, and ongoing research to address the risk factors can improve outcomes for this vulnerable population. By focusing on preventive measures, effective management of chronic diseases, healthcare providers could reduce the incidence and improve the quality of life of this elderly patients at risk of lower limb amputations.

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