



Original

Factors Influencing the Adoption, Non-Adoption and Abandonment of Lower Limb Prostheses among Amputees in Selected Hospitals in Owerri, Imo

¹Ugorji TN, ¹Morenikeji SP, ²Kekere TF, ¹Odoh IO, ²Ayinla SC, ³Bright-Ohaeri FC

¹Department of Prosthetics and Orthotics, School of Health Technology, Federal University of Technology Owerri Imo State Nigeria

²Department of Prosthetics and Orthotics, Faculty of Medical Rehabilitation, University of Medical Sciences Ondo City, Nigeria

³Department of Biomedical Engineering, School of Engineering and Engineering Technology, Federal University of Technology Owerri, Imo State Nigeria

Corresponding author: Tochukwu Nze Ugorji, Department of Prosthetics and Orthotics, School of Health Technology, Federal University of Technology Owerri Imo State Nigeria; tochukwum43@yahoo.com; +2348039221661

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Abstract

Background: A high rate of abandonment of lower limb prostheses after adoption is observed, with many amputees unable to adopt any prosthesis. This challenges rehabilitation and reintegration efforts. This study assesses the reasons behind this issue and suggests possible solutions.

Method: A descriptive cross-sectional study was conducted on 100 lower limb amputees using multistage sampling. Data were collected via a validated self-administered questionnaire and analyzed using SPSS v26.0. A significance level of 5% ($p < 0.05$) was used.

Results: The study's age range was dominated by participants aged 51-65 years (28%). Amputees with higher education levels (39%) were more likely to use prostheses. Trauma was the leading cause of amputation (55%). While 27% of respondents did not use a prosthesis, 73% did. Financial constraints prevented 34% from affording a prosthesis, but 66% could. Additionally, 31% faced difficulties accessing prostheses, and 99% had not accessed government support. Major barriers to prosthesis adoption were financial constraints (46%) and lack of access to services (22%). Proposed solutions included financial support (27%) and improved access to prosthetic services (12%).

Conclusion: The significant rate of non-adoption and abandonment of lower limb prostheses in Owerri, Imo, is attributed to financial and access barriers, highlighting the need for interventions like financial assistance and better service access.

Keywords: Prosthesis, adoption, non-adoption, abandonment, amputees.



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Introduction

The use of lower limb prosthesis has significantly improved the quality of life of amputees worldwide, offering them mobility, independence, and the opportunity to engage in various activities. However, the adoption of prostheses among amputees is not uniform, and factors influencing both adoption and non-adoption remain complex and multifaceted. This study aims to investigate and comprehend the factors that contribute to the adoption and non-adoption of lower limb prostheses among amputees in Owerri, Imo State Nigeria. By doing so, the study seeks to contribute valuable insights that can inform policies, healthcare practices, and community initiatives to promote prostheses adoption and use.^{1,2}

Lower limb prosthesis, which is artificial leg helps to rehabilitate and reintegrate lower limb amputees better, but it really calls for concern that some amputees temporarily use prosthesis, while some don't even use it after acquiring it, despite its benefits to them³. These devices play a pivotal role in restoring mobility, fostering independence, and facilitating engagement in diverse activities for individuals with limb loss.⁴

The decision of an amputee to use or abstain from prosthetic devices could not solely be a matter of technological functionality but embedded within a broader societal and individual framework. Cultural beliefs and attitudes, deeply rooted in the fabrics of Southeastern Nigeria, may shape perceptions of disability and influence the acceptance or rejection of prosthetic solutions and rehabilitation option. Economic factors, including affordability and accessibility, play a crucial role in determining the feasibility of adopting prosthetic devices, particularly in regions with varying socio-economic landscapes.^{5,6}

In many parts of Africa, persons with physical disabilities are seen as hopeless and helpless. The African culture and beliefs have not made matters easier. Studies have shown that Nigerians in particular and of course, Africans in general, attribute causes of disabilities to witchcraft, juju, sex-linked factors, God /supernatural forces, with cultural perceptions of disability differing among Nigeria's ethnic nationalities.^{6,7,8} Many amputees who never adopted prosthesis or abandoned it after adoption tend to live a sedentary and dependent lifestyle. Some even prefer to beg for arms on the street than to use prosthesis. Hence, there is need to investigate the causes of this non-adoption and abandonment of prosthesis among amputees and establish ways of

mitigating against such in order to assist them and the society at large.

Prosthetic services, including the provision of an appropriate prosthesis through use of relevant technology, are a crucial part of the rehabilitation process for individuals with lower limb amputations. This is more worrisome in developing countries where there are unique challenges in the delivery of prosthetic services that are limiting rehabilitation outcomes and consequently the well-being and socio-economic status of individuals with lower limb amputations.⁹

A recent systematic review on factors associated with prosthesis satisfaction specifically in lower limb amputees identified the device's appearance, functional and physical properties, and fit, as well as prosthesis use and medical issues of the residual limb as important variables. Sex, etiology level of amputation, and properties of the prosthesis socket might represent crucial modulating variables.¹⁰

The work investigates the major factors contributing to the non-adoption and abandonment of lower limb prostheses among amputees in Owerri and presents possible solutions to mitigate it. It is believed that the findings of this work will inform society of the rehabilitation challenges of amputees and better ways of helping them get back their lives using prostheses.

Method

Research design

A descriptive cross-sectional study was used to assess the factors influencing the adoption, non-adoption, abandonment of lower limb prostheses among amputees who had accessed healthcare services in selected hospitals in Owerri Imo State.

Study area

The population comprised amputees, who had accessed healthcare services in any of the selected hospitals in Owerri, Imo State. Imo is one of the Igbo speaking people of Southeastern Nigeria, with Owerri as the state capital city. Owerri is the hub of socio-economic activities of the state, housing the majority of the public tertiary health institutions where prosthetic services could be accessed, with few private centers that can render prosthetic services. The selected hospitals and centers were used because- it's the sure place to get in contact with the respondents (amputees).

Sampling procedure

A multistage sampling method was adopted to select 100 participants for the study. Stage one: two major public tertiary health institutions in Owerri were selected to source for contacts of amputees. Stage two: three other private healthcare centers that offer prosthetic and Orthotic services were randomly selected. Stage three: the respondents (amputees) were reached via their contacts gotten from the selected centers where they had accessed services, and consenting ones filled the questionnaire.

Sample size

The sample size was calculated based on the estimated proportion approach. Using projected population of amputees in Nigeria, the sample size was calculated from the formula ¹¹:

$$n = \left(\frac{Z_{\alpha}}{e}\right)^2 p(1-p)$$

Where, n = Sample size, Z = Value of standard variate corresponding to α , e = Acceptance error in a given situation, p = Projected proportion of cases in the population. At 95 percent confidence, with e = 0.031 and p = 0.42, we obtained n = 86. A minimum sample size of 86 was determined however, this was increased to 100 to accommodate non-response.

Data collection and analysis

A validated self-administered structured survey questionnaire used in a previous study was used for data collection.¹ The survey tool consists of four sections. Section A: socio-demographic characteristics of respondents, Section B: cause amputation and use of lower limb prosthesis, Section C: Accessibility to prosthetist and affordability of prosthesis, Section D: knowledge and accessibility to government support and subsidies for amputees to acquire prosthesis. E: Main barriers faced by amputees in adopting limb prosthesis. Quantitative data gotten from respondents was edited and coded. It was thereafter entered into the computer for analysis using Statistical Package for Social Sciences (SPSS) Vs. 26.0. Descriptive Statistics frequency table and percentages were used to summarize the data collected. Frequency distribution tables were constructed for all variables and were expressed as the percentage of the distribution. Statistical test was conducted using Chi-square test. The level of significance that was used for the test is 5% level. The significance was interpreted using p-value < 0.05.

Ethical approval

The Ethics and Review Committee of the School of Health Technology, Federal University of Technology

Owerri Imo State Nigeria gave ethical approval for the study. Participants freely gave informed consent after the assurance of the confidentiality of their information and their safety in the study and were at liberty to pull away from the study at any time without consequences.

Results

Table 1: Sociodemographic characteristics of respondents

Age (Years)	F	%
Under 20 years	11	11.0
21 - 35 years	21	21.0
36 - 50 years	27	27.0
51 - 65 years	28	28.0
Over 60 years	13	13.0
Total	100	100.0
Educational qualification		
No formal education	9	9.0
Primary education	10	10.0
Secondary education	28	28.0
Tertiary education	39	39.0
Postgraduate	14	14.0
Total	100	100.0
Employment status		
Unemployed	19	19.0
Self-employed	28	28.0
Employed part-time	19	19.0
Employed full time	23	23.0
Retired	11	11.0

Table 1 above shows that greater percentage (68%) of respondents were over thirty-five years of age, with 51-65 years having the highest percentage (28%).

Also, 9.0% of the respondents had no formal education, 10.0% had primary education, 28.0% had secondary education, 39.0% had tertiary education and 14.0% had postgraduate education.

Table 1 above also show that 19.0% of the respondents are unemployed, 28.0% of the respondents are self-employed, 19.0% are employed part-time, 23.0% are employed full-time, and 11.0% are retired

Table 2: Amputation and prosthetic history of respondents

Variables	F	%
Causes of amputation		
Trauma/accident	55	55.0
Diabetes	24	24.0
Infections	12	12.0
Congenital condition	9	9.0
Amputees currently using prosthetics		
No	27	27.0
Yes	73	73.0
Prosthesis affordability		
No	34	34.0
Yes	66	66.0
Accessibility of trained healthcare personnel		
Very accessible	3	3.0
Accessible	54	54.0
Neutral	8	8.0
Inaccessible	31	31.0
Very inaccessible	4	4.0
Knowledge and accessibility to Government support programs or subsidies available for prosthesis devices		
No	52	52.0
Yes	1	1.0
Not sure	47	47.0
Main barriers faced by amputees in adopting limb prosthesis		
Financial constraints	46	46.0
Lack of access to services	22	22.0
Poor quality or fit of prosthesis	7	7.0
Cultural/social stigma	7	7.0
Lack of awareness or information	7	7.0
Multiple choice 1-5	11	11.0

Table 2 above shows that 55.0% of the respondents were amputated as a result of trauma which had the highest percentage, followed by 25.0% which was amputation due to diabetes, 12.0% was due to infections and 9.0% was due to congenital conditions.

Also, 27.0% of the respondents were not using a prosthesis currently, while 73.0% of the respondents are using a prosthesis.

Table 2 also shows that 34.0% of the respondents cannot afford the cost of the prosthesis and were assisted to procure it, while 66.0% could afford the cost of a prosthesis.

It went further to show that 3% of the respondents found prosthetists very accessible, 54% found them accessible, 8% were neutral, 31% found them inaccessible and 4% found them very inaccessible.

The knowledge and access to government support programs or subsidies for amputees from the table shows that 52.0% of the respondents said they were no Government support programs or subsidies, 1.0% said there is Government support programs, while 47.0% were not sure about the existence of Government support programs or subsidies.

The main barriers faced by amputees in adopting limb prosthesis as presented in the table shows that 46% of the respondents indicated financial constraints as the main barrier to prosthetic limb adoption, 22% indicated lack of access to services, 7% indicated poor quality or fit of prosthesis, 7% indicated cultural/social stigma, 7% indicated lack of awareness or information, 11% choose multiple factors.

Table 3: Supposed Interventions/supports to assist amputees to adopt prosthesis

Variables	F	%
Financial support	27	27.0
Improved access to prosthesis services	12	12.0
Better quality & fitting of prosthesis	13	13.0
Community & family support	15	15.0
Increased awareness & information	5	5.0
Technological advancements in prosthesis	10	10.0
Psychological support & counselling	1	1.0
Multiple choice 1 – 8	17	17.0

Table 3 shows Supposed Interventions/supports to assist amputees to adopt prosthesis according to the opinions of amputees. 27.0% of the respondents indicated financial support as the main intervention to encourage prosthetic limb adoption, 12.0% indicated improved access to prosthetic services, 13.0% indicated better quality and fit of prosthesis, 15.0% indicated community & family support, 5.0% indicated increased awareness & information, 10.0% indicated technological advancements in prosthesis, 1.0% indicated psychological support & counselling, 17.0% choose multiple factors.

Discussion

The rate of non-adoption and abandonment of lower limb prosthesis among amputees in Owerri Imo is significant due to some identified barriers in the study which included; affordability, accessibility, awareness and technology. Financial support, improved access to

prosthetic services, better quality and fit of prosthesis, community & family support, increased awareness & information, technological advancements in prosthesis, psychological support & counselling are the interventions suggested by respondents to assist amputees in this regard. Government, society and individuals need to step up availability and awareness of interventions/supports that will help and encourage adoption and use of lower limb prosthesis among lower limb amputees in Owerri Imo state Nigeria.

A greater percentage (68%) of respondents were over thirty-five years of age, with 51-65 years having the highest percentage (28%). This finding agrees with (Diana, 2009), which reported that the most common age range for amputation is 45 to 64 years in America, with diabetics being the leading cause. This could be that diabetes and other underlying health conditions, usually manifest and get complicated within this age range, thus leading to amputation.¹¹

The respondents' educational background is given as; 9.0% of the respondents had no formal education, 10.0% had primary education, 28.0% had secondary education, 39.0% had tertiary education and 14.0% had postgraduate education. The percentage of amputees increased significantly, as the level of acquired education increased. This could be attributed to their educational exposure being a driving force for them to have knowledge, access, and need for quality healthcare services, both before and after amputation.

Unemployed respondents were 19.0%, self-employed 28.0%, part-time employed 19.0%, full-time employed 23.0%, and 11.0% are retired. Employed respondents dominated the study (70%). This confirms that the unemployed Nigerian population has little or no access to quality healthcare, including the retired (11%).

Trauma (55%) and diabetes (24%) were the leading causes of amputation. This aligns with many studies that have reported trauma and diabetes as the leading causes of limb amputations in Africa, and diabetes in Europe and America.^{1,12}

A good number of amputees (73.0%) were currently using a prosthesis, while 27.0% of them were not using a prosthesis currently. The population not using prostheses (27.0%) was significant, and could be as a result poor technology, lack of access to fund for maintenance, repair or replacement of prosthesis, psycho-social issues and lack of access to the prosthetist. The significant population of the respondents (31%)

found prosthetist inaccessible and 4% found them very inaccessible.

Many of the respondents (52.0%) said they were not aware of any government support programs or subsidies to help amputees acquire prosthesis, 47.0% were not sure about the existence of such government support programs or subsidies, while 1.0% said there is government support programs, which Breakey had a similar report in his study.¹³ The amputees indicated their barriers to adopting limb prosthesis as; 46% of the respondents indicated financial constraints as the main barrier to prosthetic limb adoption, 22% indicated lack of access to prosthetic services, 7% indicated poor quality or fit of prosthesis, 7% indicated cultural/social stigma, 7% indicated lack of awareness or information, 11% choose multiple factors. Supposed Interventions/supports to assist amputees to adopt prostheses according to the opinions of amputees. 27.0% of the respondents indicated financial support as the main intervention to encourage prosthetic limb adoption, 12.0% indicated improved access to prosthetic services, 13.0% indicated better quality and fit of prosthesis, 15.0% indicated community & family support, 5.0% indicated increased awareness & information, 10.0% indicated technological advancements in prosthesis, 1.0% indicated psychological support & counselling, 17.0% choose multiple factors. These seem to be a very big challenge to the amputees, because from a survey of the catalog of Prosthetists in South-Eastern Nigeria, through the Nigerian Society of Prosthetists, Orthotists and Orthopaedic Technologists, the average cost of below-knee prosthesis is above one million naira. Nigeria being a development country with high poverty index, many of the amputees will find it difficult to self-sponsor acquisition of prosthesis. The Nigerian government need to capture prosthetic services in health insurance programs like National Health Insurance Scheme (NHIS), so as to assist amputees, who depend so much on prosthesis for rehabilitation and reintegration into the society.

Also, prosthetics being an emerging field in Nigeria, government need to regularly organise and sponsor trainings (local and international) for prosthetists in Nigeria in order to overcome the barrier of poor quality of prosthesis as reported by 13% of the amputees.

Implications of the findings of the study

This study will help to expose the causes of lower limb prosthesis abandonment and non-adoption among amputees, as well as proffer possible solutions to it. This will help to improve amputees' rehabilitation and



reintegration, strengthen Nigeria's health system and service delivery, and also improve the economy because amputees will have socioeconomic independence when rehabilitated better.

Strengths and Limitations of the Study

Many of the respondents were reluctant to partake in the study. This is due to their feeling of been abandoned and neglected by the government, despite the fact that they are disabled and need support. Some of them were even gifted before they accepted to partake in the study. The high cost of transportation occasioned by fuel subsidy removal affected the budget of the work, as the researcher had to shuttle to the centers used for the study to meet with the respondents.

Conclusion

The study explored the factors influencing the adoption, non-adoption and abandonment of lower limb prostheses among amputees in Owerri, Imo state Nigeria. The study found that the abandonment and non-adoption of lower limb prosthesis was high¹⁴ and identified financial constraints, lack of access to prosthetic services, poor quality/fit of prosthesis, cultural and social stigma, lack of awareness and information as the barriers to adoption and sustain adoption of lower limb prosthesis among the populace. This implies that some amputees discontinue the use of lower limb prosthesis after adoption and some who need prosthesis have not even adopted it for once.

The study also found out that many amputees need interventions/support to adopt and sustain the use of prostheses after adoption. These interventions may include financial support from the government like health insurance programs, improved quality of prosthesis, community and family support, increased awareness, and information.¹⁵

Declarations

Ethical Consideration: The Ethics and Review Committee of the School of Health Technology, Federal University of Technology Owerri Imo State Nigeria gave ethical approval for the study. Participants freely gave informed consent after the assurance of the confidentiality of their information and their safety in the study and were at liberty to pull away from the study at any time without consequences.

Authors' Contribution: TNU conceptualized and supervised the study. SPM collected the data. TFK wrote the introduction and literature review. IOO wrote the methods and conclusion, ASC typed the manuscript,

and FCB analyzed the data. The final draft was approved by all the authors.

Conflict of interest: The authors have no conflict of interest to declare.

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