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A Prospective Research Study on the Appraisal of Lower Limb Amputee Experiences with Prostheses in Southeast Nigeria

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Abstract

The objective of this research was to explore the experiences of lower limb prosthetic users with a view to understanding the importance of lower limb prostheses, identifying factors that lead to the abandoning of Prostheses in the course of use, highlighting use issues that affect their daily living, and evaluating the effectiveness of Prostheses in the rehabilitation of lower limb amputees. The methodology employed in this research study and data collected from the respondents were edited and coded. It was thereafter entered into the computer for analysis using Statistical Package for Social Sciences (SPSS) Vs. 17.0. Descriptive Statistics such as pie chart 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. Hip Disarticulation and Knee Disarticulation was reported by one respondent each, 33.3% had toe amputations, while Transfemoral TF and Transtibial TT was reported by 26.32% and 28.07%. Also, 17% of the respondents had used their prosthesis for less than 2 years; 37% have used their prostheses for about 2 to 5 years while 19% and 27% reported having used their fitting for 6 to 10 years and above 10 years respectively. 46% of the amputations were caused by diabetes, while trauma and infections accounted for 11% and 18% respectively. Conclusively, support and finance were observed to be critical for enhanced user experience. It is of the essence that government should provide financial assistance to amputees being rehabilitated as this is one major reason they skip therapy. Family members are advised to always stay close to these lower limb prostheses users especially in their initial usage to help them with adoption and adaptation. Health education for lower limb amputee using a prosthetic device by the health workers on usage, care and maintenance will also help their continued usage and avoid their future disuse.

Subject Areas

Rehabilitation Medicine

Keywords

Lower Limb, Amputee, Prostheses, Amputation, Rehabilitation

1. Introduction

Amputation is a treatment of choice in several health conditions. Many factors shape a patient's psychological reaction to amputation, including age, type and level of amputation, time since amputation, social support, and active coping mechanisms (Mckechnie and John, 2014 [1]; Belon and Vigod, 2014 [2]; Bragaru, *et al*., 2013 [3]).

Amputation of the Lower Extremity is one of the oldest known surgically performed procedures. History has recorded that prehistoric humans underwent traumatic, ritualistic, or punitive amputations, rather than therapeutic ones. Cave-wall hand markings or imprints demonstrated the loss of digits and also unearthed mummies have been found buried with cosmetics replacements for amputated extremities.

Also one of the major risks which were faced in the early history of amputation was much loss of blood (hemorrhage) shock and Sepsis. Before anesthesia was discovered, the procedure for amputation was difficult (Durmus, *et al*., 2015) [4]. The patient was usually held by a number of assistants and was given alcohol which according to him was usually rum. This kept the patient awake and so fully aware of the procedure.

Patients and family members must be aware of their options and have realistic expectations of surgical outcomes in order to make an informed decision. It is important to recognize that individuals undergoing amputation surgery may have to face psychological stigma associated with the loss of a limb in society. Persons who have undergone amputation are often viewed as incomplete individuals. After the removal of a diseased limb and application of an appropriate prosthesis, the patient can resume being an active member of the society and maintain an independent lifestyle. Thus, the purpose of this research was to explore the experiences of lower limb prosthetic users with a view to understanding the importance of lower limb prostheses, identifying factors that lead to the abandoning of Prostheses in the course of use, highlighting use issues that affect their daily living, and evaluating the effectiveness of Prostheses in the rehabilitation of lower limb amputees.

2. Methodology

2.1. Study Design

The design used for this study is a descriptive survey. This was used to elicit the

use to appraise the usage experience of lower limb prosthetics users in the study area such that inferences can be drawn for generalizing the entire population under a natural setting using the questionnaire.

2.2. Description of Study

This research was carried out using questionnaires on all consenting patients in; National Orthopedic Hospital Enugu, Christiana Hospital Owerri, and Royal Prosthetic and Orthotic Center (ROPOC) Owerri (affiliated to F.M.C.) in the south-eastern part of the country and was done in two stages which are; desk study and field study.

2.2.1. Desk Study

This aspect of the work simply involved the process of gathering specific and reference points in the execution of this project. This information includes official company and academic publication journals, research journals, textbooks and project work specific to this topic and these are the primary source of information.

2.2.2. Field Study

This was a prospective study carried out on all consenting patients who had extremity amputation in about three hospitals in three states in the south East.

Participants: The study includes most rehabilitated amputees.

2.3. Validity of the Instrument

The study questionnaire was carefully prepared and was approved after a few corrections.

2.4. Reliability of the Instrument

Test-retest method was used to test the reliability of the questionnaire. The questionnaire was initially administered to 15 subjects in a similar study population and the process was repeated one week later and the result was scaled and compared for consistency test using Cronbach's alpha test.

2.5. Method of Data Collection

The Amputees evaluation survey was prepared for study and participants were told to complete them (Both bilateral and unilateral amputees). The literate respondents were allowed to fill out the questionnaire themselves but for the non-literate respondents, they were asked in their local language and some had the questionnaires translated to them through an interpreter and their responses were filled. Each questionnaire took about 4 - 6 minutes to be completed.

2.6. Method of Data Analysis

Data collected from the respondents were edited and coded. It was thereafter entered into the computer for analysis using Statistical Package for Social

Sciences (SPSS) Vs. 17.0. Descriptive Statistics such as pie chart 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.

2.7. Ethical Consideration/Informed Consent

Ethical clearance and approval were ascertained from the various orthopedic hospitals visited. Permission to conduct the study was formally requested then verbal informed consent was obtained from all the respondents before being allowed to participate in the study.

3. Result and Discussion

3.1. Demographic Detail of the Participants (n = 114)

3.1.1. Gender Distribution

The gender distribution of respondents is presented in Figure 1 below. Survey results indicate a greater proportion of males with lower limb amputations than females.

3.1.2. Age Distribution

The Age distributions of the surveyed prosthetic users are summarized in Figure 2.

As indicated in Figure 2, a greater percentage (>70%) of respondents are over thirty-five years of age where the mean age is (28.5 ± 10.8 years). On face evaluation, older respondents are found in the population of lower limb amputees who use prostheses. This most likely can be the result of health-related issues.

3.1.3. Marital Status

The marital statuses of the surveyed respondents are summarized in Figure 3.

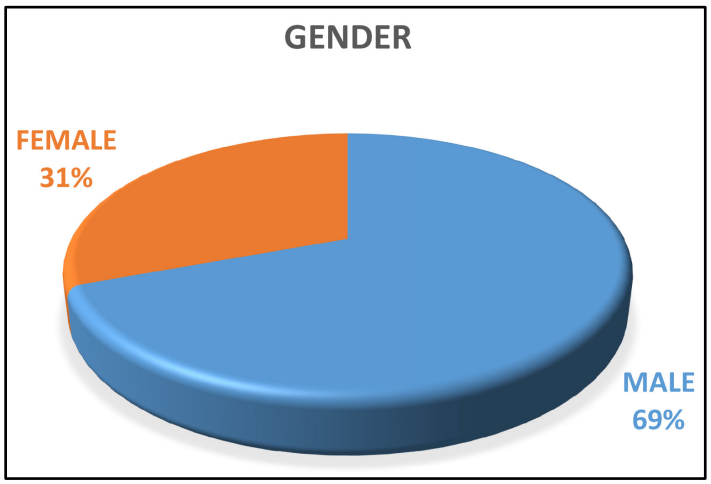

Figure 1. Graphic description of Gender distribution of participants.

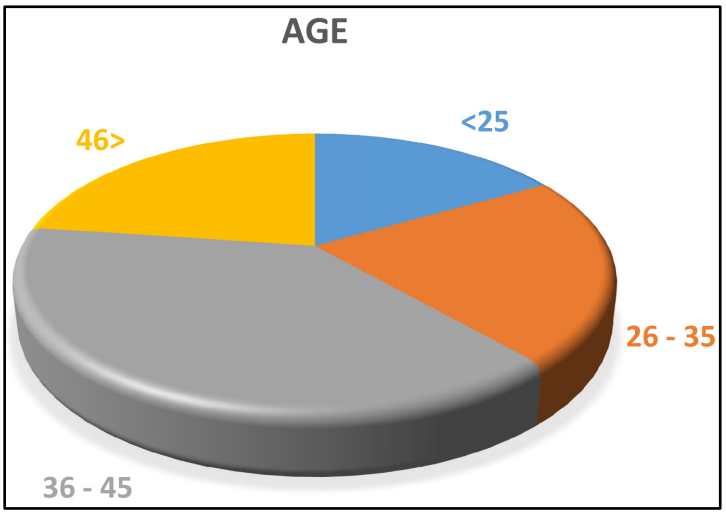

Figure 2. Graphic description of Age distribution of participants.

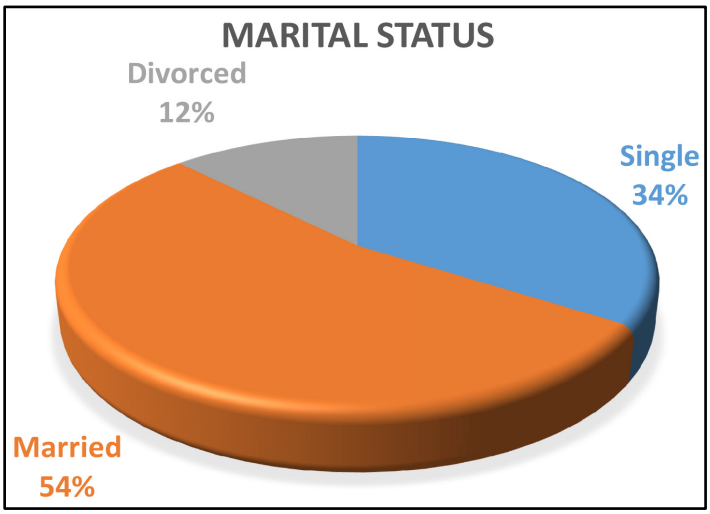

Figure 3. Graphic description of marital status of the respondents.

As indicated in **Figure 3** about 54% of the respondents indicated that they are living with their spouse, while single respondents were about 34% and 12% reported being divorced. This indicates that the respondents had varying marital backgrounds which could contribute to their use or disuse of a prosthetic device.

3.1.4. Occupation of Respondents

The occupations of the prosthetic users are summarized in **Figure 4**.

From **Figure 4** shown below, 26% respondents were unemployed, about 30% reported being employed (private sector firms), 18% reported being employed by the government (civil service) while 25% of the prosthetic users had no form of employment and were dependent on assistance from family a further smaller percent of these categories reported being laid off their job due to the amputation. **Figure 4** graphically shows the distribution of the respondents' occupations according to category (Self-employed, Civil Service, Employed and Unemployed).

3.1.5. Amputation Type Distribution

The amputation type distribution of the surveyed respondents is presented in Figure 5 below. Collected responses show no respondent had Hemipelvectomy. Hip Disarticulation and Knee Disarticulation was reported by one respondent each.

Figure 5 indicates that 33.3% of the survey population had toe amputations, while Transfemoral TF and Transtibial TT were reported by 26.32% and 28.07% of the participating respondents.

3.1.6. Prostheses Use Duration Distribution

The surveyed respondents indicated the number of years they have been using prostheses and this is indicated in Figure 6.

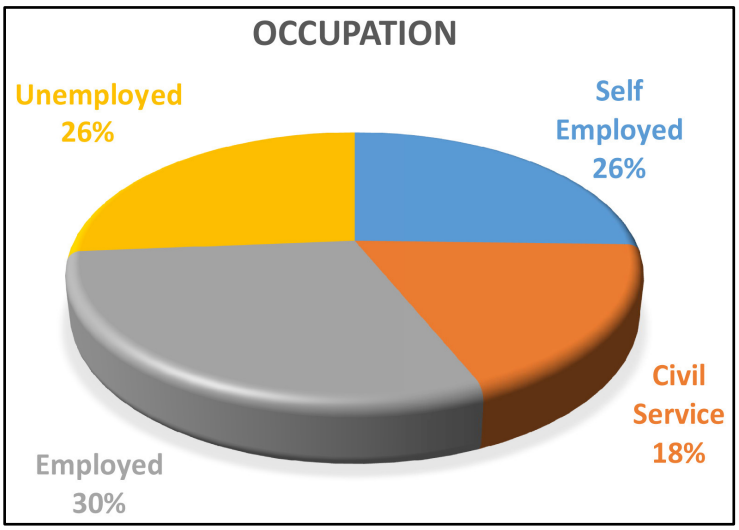

Figure 4. Graphic description of amputation type distribution of participants.

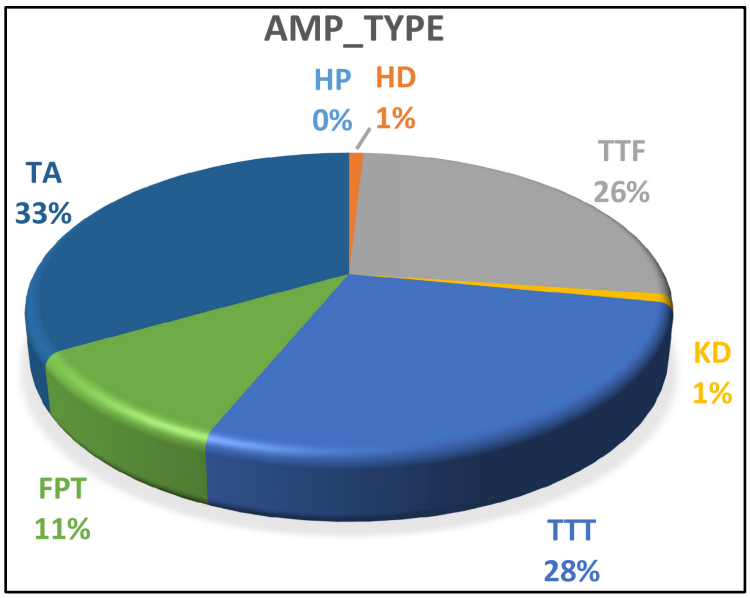

Figure 5. Graphic description of amputation type distribution of participants.

From Figure 6 about 17% of the respondents have used their prosthesis for less than 2 years; 37% have used their prostheses for about 2 to 5 years while 19% and 27% reported having used their fitting for 6 to 10 years and above 10 years respectively.

3.1.7. Etiology of Amputation Distribution

The etiology of the amputation as collected is reported in Figure 7.

From Figure 7, diabetes was reported as the leading cause of amputation among the survey participants. It was observed that diabetes accounted for 46% of the amputations, while trauma and infections accounted for 11% and 18% respectively. 25% report unknown causes of amputation.

3.2. Evaluation of User Experience with Prosthesis

A narrative has been presented to contextualize results and show how the surveyed respondents categorize their user experience of the different lower limb prosthetic devices. This section of the questionnaire used was adapted from PEQ Prosthetic Evaluation Questionnaire and summarized in Table 1.

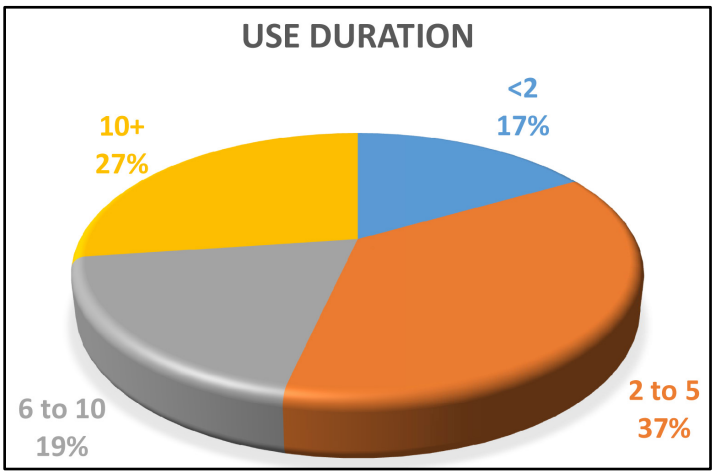

Figure 6. Graphic description of prosthesis use duration distribution of participants.

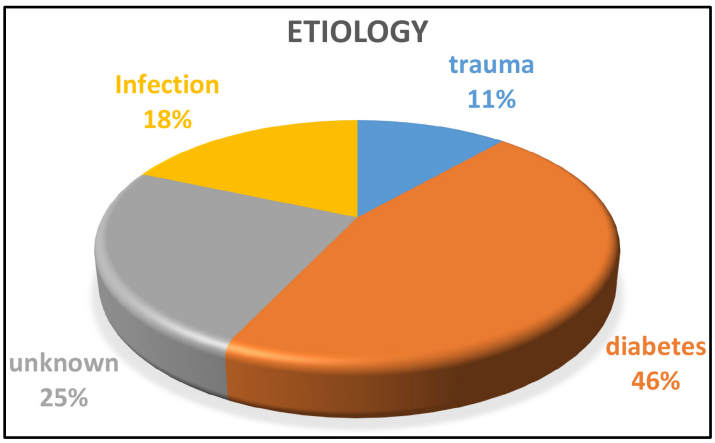

Figure 7. Graphic description of prosthesis use duration distribution of participants.

Table 1. User experience with a prosthetic device.

s/n	Response category	Appearance (Mean ± SD)	Ambulation (Mean ± SD)	Frustration (Mean ± SD)	Residual Limb health (Mean ± SD)	Social burden (Mean ± SD)
	(Yes)	79 ± 16	84 ± 13	93 ± 1	76 ± 11	82 ± 6
	(No)	35 ± 11	30 ± 6	21 ± 5	38 + 9	32 ± 5

4. Discussion and Conclusion

4.1. Discussion

The purpose of this research was to critically appraise the experiences of lower limb amputees who use prostheses in Southeast Nigeria. The research focused on the qualitative life of people with lower limb amputations who use prostheses; Explored the experiences of lower limb prosthetic users with a view to understanding the importance of lower limb prostheses, identifying factors that lead to the abandoning of Prostheses in the course of use, highlighting usage issues that affect their daily living, and evaluating the effectiveness of Prostheses in the rehabilitation of lower limb amputees. In consideration, the 114 participants' population sample covered the following amputees with: 1) ≥6 months' post amputation; 2) able to read English; and 3) ≥18 years of age. The result of this study shows: Hip Disarticulation and Knee Disarticulation was reported by one respondent each, 33.3% had toe amputations, while Transfemoral TF and Transtibial TT was reported by 26.32% and 28.07%. Also, 17% of the respondents had used their prosthesis for less than 2 years; 37% have used their prostheses for about 2 to 5 years while 19% and 27% reported having used their fitting for 6 to 10 years and above 10 years respectively. 46% of the amputations were caused by diabetes, while trauma and infections accounted for 11% and 18% respectively. Conclusively support and finance were observed to be critical for enhanced user experience. In literature research, the majority of previous studies have focused on the impact of amputation and the effectiveness of rehabilitation programs. While several qualitative studies have explored specific experiences of persons with amputation, such as coping, adjustment or psychological growth experiences, to our knowledge, no studies have appraised the experiences rehabilitated amputees go through in their use of lower limb prostheses, in a bit to proffer a solution and make them have better living or better experiences.

4.2. Conclusions

- Prosthetic users usually find it an economic challenge to get a suitable recommended prosthetic device and any subsequent prescription for change or modification is most fraught with resistance.
- Amputees that had the most experiences with their prostheses were amputees with major lower limb amputations like: Hip disarticulation, Knee disarticulation, and Ankle disarticulation, while amputees with minor amputations

like Symes amputations didn't really have many experiences with prostheses.

- Other experiences involved their sockets. Some individuals did not replace their prostheses, but instead chose to change their sockets.
- The greatest desire of lower limb prosthetic users is ambulation thus cosmetic characteristics of the prosthesis are largely placed low in their scale of choice.
- Rehabilitation efforts are not usually followed through, especially among the younger respondents. Surprisingly, the same issue was observed with the older respondents as well.
- Continued usage was observed to correlate greatly with marriage and availability of income (civil service, self-employed and farmers).
- It can be inferred that support from a spouse and finance significantly affects the prolonged or continued use of a prosthetic device.

Conflicts of Interest

The authors declare no conflicts of interest.

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