



Occupational therapy rehabilitation of lower limb amputees in the Nigeria Armed Forces Medical Services

Anthonette A.I. Emechete, Chidozie Emmanuel Mbada

ABSTRACT

Background and objective: Soldiers are known to always sacrifice to defend the integrity of their nation and in the process may lose limbs even their lives. Injuries resulting from war are a major cause of disablement in armed forces personnel. This paper presents the outcome of a study on the Occupational Therapy Rehabilitation Programme (OTRP) of the post-war lower limb amputees at the Armed Forces Convalescent and Rehabilitation Depot, Lagos, Nigeria. **Methods:** Eighty soldiers (30 with above knee amputation and 50 with below knee amputation) who were given furloughs from the military authority and had satisfactorily completed physiotherapy prosthetic ambulatory training were recruited into this pre-test and post-test study. A 3-part questionnaire dealing with prosthetic use and training, social and family and work assessment was used. OTRP involved three phases; the initial assessment and evaluation phase; the intermittent phase of sequentially pre-prosthetic stump exercises, gait training, simulated vocational and job training; and the final phase of work assessment and job placement. OTRP was carried out thrice weekly for eight weeks and outcomes were assessed at inclusion and 8th week respectively. **Results:** The percentage difference in pre-and-post OTRP in terms of participants' impression, usability, satisfaction and confidence in the use of prostheses was 62.5, 62.5, 45.0 and 32.5% respectively. Prosthetic use affected the sexual life of 25% of the married participants but there was no reported change following OTRP. Following OTRP, 18.8% of the participants intended to return to their previous occupation before joining the army, 44% wanted to go school, 56.3% desired better jobs; 98.8, 75.0 and 62.5% of the participants believed they could play soccer, swim and drive a car respectively. **Conclusion:** Occupational Therapy Rehabilitation Programme for post-war lower limb amputees who were on prostheses had positive influence on their attitude towards prosthetic use, social and family life, and perception on return to work, sports and vocation.

KEY WORDS: Occupational therapy; Rehabilitation; Lower limbs; Amputee; Civil war; Soldiers

Department of Medical Rehabilitation
College of Health Sciences, Obafemi
Awolowo University Ile-Ife, Nigeria

Address for correspondence:
Chidozie Emmanuel Mbada,
Department of Medical Rehabilitation
College of Health Sciences, Obafemi
Awolowo University Ile-Ife, Nigeria,
doziembada@yahoo.com

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INTRODUCTION

Lower extremity amputation is one of the earliest known surgical operations [1, 2]. Lower extremity amputation is often viewed as failure of treatment [3] or a life-saving procedure performed to remove ischemic, infected, necrotic tissue or locally unresectable tumor [4]. Peripheral vascular disease alone or in combination with diabetes mellitus; followed by trauma are the leading causes of lower extremity amputation [4-6].

Wartime amputations, especially in battle is a major cause of disablement in armed forces personnel who are in the prime of their military career [7]. Majority of the limb loss during war results in lower extremity amputations [8]. As such, the pattern of amputation resulting from trauma in young military personnel, differ from those seen in civilians [9]. Atesalp et al [10] submits that landmine explosions cause most of the war injuries in battlefield which consequently result in amputations. Also gunshots, mortar shelling, air raid bombs and grenade bombs result in severe injuries that may necessitate amputation. Consequently, limb amputation significantly alter multiple aspects of an individual's life

including body image, self care activities, mobility, psychosocial health, vocational and avocational activities [11].

Rehabilitation of amputees is critical for the care of soldiers who had suffered war related disablement such as limb amputation. The rehabilitation programme often requires a team of skilled professionals who will provide optimum care [12]. Kumar and Kumar [13] submits that provision of suitable prostheses and orthoses is the most effective step in returning the patient to a normal and productive place in society. However, evidence on the effectiveness of Occupational Therapy (OT) interventions in lower limb amputations is scarce [14]. This paper present the outcome of a study on the Occupational Therapy Rehabilitation Programme (OTRP) of the post-war lower limb amputees treated at the Armed Forces Convalescent and Rehabilitation Depot, Lagos, Nigeria.

MATERIALS AND METHODS

Eighty soldiers with lower limb amputation participated in this pre and post test study. This study was conducted by Lt Col. (Rtd) Anthonette A.I. Emechete (B.Sc OT M.Ed. MAOT) in

1974 as part of the credentialing for the degree programme in OT of the School of Rehabilitation Medicine, University of Alberta, Edmonton, Alberta, Canada. The participants in this study were post war lower limb amputees who were receiving treatment at the Armed Forces Convalescent and Rehabilitation Depot (AFCARD), Lagos, Nigeria. The participants gave verbal consent to participate in this study. The AFCARD which is one of the 10 centres established by the Federal government of Nigeria, was established to provide comprehensive rehabilitation for veterans of the Nigeria civil war.

Thirty of the participants in this study had above knee amputation while the remaining 50 had below knee amputation. None of the participants had bilateral amputation. All participants in the study were given furloughs from the military authority and were referred for OT having satisfactorily completed limb exercises and ambulatory training with the physiotherapists.

A three-phase Occupational Therapy Rehabilitation Programme (OTRP) was implemented in this study. The OTRP involves - (i) Initial assessment and evaluation phase – this involved demographics, activities of daily living, vocational assessment, and social lifestyle assessment. (ii) Intermittent phase – this involved sequentially pre-prosthetic stump exercises, gait training, light sitting activities, weight bearing and balance activities, simulated programmes such as driving and farming, and vocational and job training. (iii) Final phase – work assessment and job placement. The occupational therapy rehabilitation was given thrice weekly for eight weeks and outcomes were assessed at inclusion and 8th week respectively. The vocational training of the participants commenced at the 12th week of enrolment into the study. The data for work assessment and job placement were not part of this present paper.

A three-section questionnaire was used to evaluate the outcome of the OTRP in this pre- and post-test study design. The section A of the questionnaire assessed attitude of the participants towards disabilities and prostheses use. Section B assessed the participants feeling of self-consciousness towards disabilities and prostheses use. Section C assessed the social aspects of the participants.

Data Analysis

Data were analyzed using descriptive statistics of frequency and percentages. Inferential statistics of Chi-square test was used to compare percentage difference in pre and post intervention. WinPepi software (WinPepi.Ink) was used to compute the Chi-Square results from the percentages. Alpha level was set at 0.05.

RESULTS

Table 1 presents the pre and post OTRP assessment of participants' attitude towards disabilities and prostheses use. Following OTRP, there was 62.5% positive change in

the participants' impression and usability of their prosthesis respectively ($p < 0.05$). Satisfaction with and confidence in the use of prosthesis increased by 45 and 32.5% respectively while the usage of prostheses at all times increased by 25% ($p < 0.05$). The assessment of participants' feeling of self-consciousness towards their prostheses and disabilities is presented in Table 2. A majority (67.5%) of the participants demonstrated increased positive attitude by wearing their prostheses away from the depot ($p < 0.05$). Assessment of attitude of the participants towards their social life is presented in Table 3. Prosthetic use affected the sexual life of 25% of the married participants and did not change following OTRP ($p < 0.05$). Participants' attitude towards return to work and vocation is presented in Table 4. Following OTRP, 18.8% of the participants intended to return to their previous occupation before joining the army, 44% wanted to go school while 56.3% desired something better ($p < 0.05$). Table 5 shows the assessment of participants' perception on sporting activities. 98.8% believed they could play soccer, 75% believed they could swim while 62.5% believed they could drive a car ($p < 0.05$).

DISCUSSION

This study evaluated the effect of OTRP on attitude towards disabilities and prostheses use, social life and return to work and vocation; and the feeling of self-consciousness towards their prostheses and disabilities; and perception on sporting activities among post-war lower limb amputees in the Nigeria Army Medical Services. There is limited literature on the role of OT in lower limb amputation compared with upper extremities amputation. However, the College of Occupational Therapists (COT) [15] asserts that occupational therapists have a role to play at all stages of rehabilitation of people with lower limb amputations which cuts across the pre-amputation, post-amputation, pre-prosthetic and post-prosthetic phases and throughout the person's life. The result of this study indicate that OTRP for lower limb amputees led to positive improvement in attitude towards disabilities and prostheses use.

Lower limb amputation results in a gamut of physical and psychosocial challenges which are not limited to pain and physical dysfunctions, but psychosocial impairment including employment/occupation and lifestyle change related depression [16-19]. Therefore, rehabilitation must seek to address both the physical and psychosocial aspects of amputation [20]. Pezzin et al [21] submits that rehabilitation has a substantial effect in improving long-term physical, social and mental health outcomes of people with trauma-related amputations. Furthermore, OT is reported to have a real effect on the quality of life in persons with lower limb amputations [15]. Bilodeau et al [22] found that OT intervention significantly improved attitude and use of prostheses in persons with amputation.

Table 1. Assessment of participants' attitude towards their disabilities and prostheses before and after occupational therapy intervention (N=80)

	Question	Pre-OT N(%)	Pre-OT N(%)	% diff	Chi-Square	P-value
	What is your impression of your prosthesis?					
1	I like it	20(25)	70(87.5)	62.5	63.525	0.001
	It is alright	50(62.5)	8(10)	52.5		
	I dislike it	10(12.5)	2(2.5)	10.0		
	Have you learnt to use your prosthesis?					
2	Quite well	30(37.5)	80(100)	62.5	72.727	0.001
	Fairly well	45(56.3)	0(0)	56.3		
	Not so well	5(6.3)	0(0)	6.3		
	Are you satisfied with your prosthesis?					
3	Yes	40(50)	76(95)	45.0	41.055	0.001
	No	30(37.5)	4(5.0)	32.5		
	Don't Know	10(12.5)	0(0)	12.5		
	Do you think you can manipulate your prosthesis as it should be?					
4	Yes	40(50)	78(97.5)	47.5	46.737	0.001
	No	30(37.5)	2(2.5)	35.0		
	Don't Know	10(12.5)	0(0)	12.5		
	Are you confident in your prosthesis?					
5	Yes	50(62.5)	76(95)	32.5	25.827	0.001
	No	8(10)	0(0)	10.0		
	Don't Know	22(27.5)	4(5)	22.5		
	Does the prosthesis enhance your self-confidence?					
6	Yes	76(95)	79(98.8)	3.8	1.858	0.173
	No	4(5)	1(1.25)	3.75		
	Do you find your prosthesis as an asset or hinderance?					
7	An Asset	30(37.5)	76(95)	57.5	59.147	0.000
	Hinderance	50(62.5)	4(5)	57.5		
	How much time do you wear your prosthesis?					
8	All the time	40(50)	60(75)	25.0	13.333	0.004
	Most of the times	15(18.8)	10(12.5)	6.3		
	Only when necessary	20(25)	10(12.5)	12.5		
	Not at all	5(6.3)	0(0)	6.3		
	How long can you wear your prosthesis without removing it?					
9	Could wear it all day	60(75)	78(97.5)	22.5	17.181	0.001
	Could wear it six hours	11(13.8)	1(1.3)	12.5		
	Could wear it 2 to 4 hours	7(8.8)	1(1.3)	7.5		
	Could wear it less than 2 hours	2(2.5)	0(0)	2.5		

Alpha level was set at $p < 0.05$

From the result of this study, satisfaction with and confidence in the use of prostheses increased by 45 and 32.5% respectively while the usage of prostheses at all times increased by 25%. Self-esteem and satisfaction with life are among the psychosocial factors that are often impaired in lower limb amputation [15]. Therefore, interventions that target psychosocial impairment

related to amputation are particularly important [15, 24]. OT interventions for lower limb amputation has been reported to have positive influence on psychosocial aspects of the patients' life by decreasing anxiety and depression for the individual, both through activities of daily living and in return to work [17, 25].

Table 2. Assessment of attitude of the participants feeling of self-consciousness towards their prostheses and disabilities

	Question	Pre-OT N(%)	Pre-OT N(%)	% diff	Chi-Square	P-value
1	Have you worn your prosthesis away from the depot?					
	Yes	25(31.3)	79(98.8)	67.5	80.111	0.001
	No	55(68.8)	1(1.3)	67.5		
2	Do you feel as if people stare at you?				40.126	0.001
	Yes	40(50)	10(12.5)	37.5		
	No	10(12.5)	45(56.3)	43.8		
3	Do you feel as if people stare at you?				0.262	0.609
	Felt as if they did, but did not mind	20(25)	15(18.8)	6.2		
	Felt that people stare less than at first	10(12.5)	10(12.5)	0.0		
4	Are you ashamed of your prosthesis?				10.667	0.001
	Yes	10(12.5)	0(0)	12.5		
	No	20(25)	80(100)	75.0		
5	Do you stay away from people because of your prosthesis?				10.667	0.001
	Yes	10(12.5)	0(0)	12.5		
	No	70(87.5)	80(100)	12.5		
6	Do you dread wearing your prosthesis home?				5.161	0.023
	Yes	5(6.25)	0(0)	6.25		
	No	75(93.8)	80(100)	6.2		
7	Do you think your handicap will make any difference to your friend?				5.161	0.023
	Yes	5(6.25)	0(0)	6.25		
	No	75(93.8)	80(100)	6.2		

Alpha level was set at $p < 0.05$ **Table 3.** Assessment of attitude of the participants towards their social life following occupational therapy intervention

	Question	Pre-OT N(%)	Pre-OT N(%)	% diff	Chi-Square	P-value
1	Are you married?				0.000	1.000
	Yes	20(25)	20(25)	0.0		
	No	60(75)	60(75)	0.0		
2	Do you think your handicap will affect your marriage?				0.000	1.000
	Yes	0(0)	0(0)	0.0		
	No	20(25)	20(25)	0.0		
3	Have you been with your wife since you have received your prosthesis?				0.000	1.000
	Yes	5(6.3)	5(6.3)	0.0		
	No	15(18.8)	15(18.8)	0.0		
4	Do you think your family attitude will change towards you because of your handicap?				0.000	1.000
	Yes	0(0)	0(0)	0.0		
	No	5(6.3)	5(6.3)	0.0		
5	Are you engaged?				0.000	1.000
	Yes	20(25)	20(25)	0.0		
	No	40(50)	40(50)	0.0		
6	Do you still intend to marry?				2.667	0.102
	Yes	20(25)	20(25)	0.0		
	No	0(0)	0(0)	0.0		
7	Has your betrothed seen you since you received your prosthesis?				0.260	0.610
	Yes	5(6.3)	10(12.5)	6.2		
	No	15(18.8)	10(12.5)	6.3		
8	Do you think your handicap will change her affection towards you?				0.260	0.610
	Yes	0(0)	0(0)	0.0		
	No	20(25)	20(25)	0.0		
9	Have you had a date since you have received your prosthesis?				0.260	0.610
	Yes	5(6.3)	20(25)	18.7		
10	Were you embarrassed because of it?				0.260	0.610
	Yes	0(0)	1(1.3)	1.3		
	No	5(6.3)	19(23.8)	17.5		
11	Did you have good time?				0.260	0.610
	Yes	5(6.3)	20(25)	18.7		
	No	0(0)	0(0)	0.0		
12	Did she seem to have a good time with you as she or other girls used to?				0.260	0.610
	Yes	5(6.3)	20(25)	18.7		
	No	0(0)	0(0)	0.0		

Alpha level was set at $p < 0.05$

Table 4. Assessment of participants' attitude towards return to work and vocation

	Question	Pre-OT N(%)	Pre-OT N(%)	% diff	Chi-Square	P-value
1	Do you intend to return to your previous occupation before you joined the army?					
	Yes	60(75)	75(93.8)	18.8	10.667	0.001
	No	0(0)	0(0)	0.0		
	Not decided	20(25)	5(6.3)	18.7		
2	Why do you wish to procure other work?				6.234	0.013
	Plan to go to school	20(25)	35(43.8)	18.8		
	Wanted something better	60(75)	45(56.3)	18.7		
3	Have you made definite plan for the future?				6.815	0.042
	Had made definite plans	60(75)	70(87.5)	12.5		
	Had made a few plans	10(12.5)	8(10)	2.5		
	Had made no plans	10(12.5)	2(2.5)	10		
4	Are you confident you will be able to support yourself and family?				22.857	0.000
	Yes	60(75)	80(100)	25.0		
	No	20(25)	0(0)	25.0		
5	Have you inquired regarding the training offered by the government?				124.444	0.000
	Yes	0(0)	70(87.5)	87.5		
	No	80(100)	10(12.5)	87.5		

Alpha level was set at $p < 0.05$ **Table 5.** Assessment of participants' perception on sporting activities

	Question	Pre-OT N(%)	Pre-OT N(%)	% diff	Chi-Square	P-value
1 Do you think you will be able to take part in the following sports?						
A	Soccer				156.049	0.001
	Yes	0(0)	79(98.8)	98.8		
	No	80(100)	1(1.2)	98.8		
B	Swimming				140.491	0.001
	Yes	0(0)	60(75)	75		
	No	80(0)	5(6.3)	6.3		
	Don't Know	5(6.3)	0(0)	6.3		
C	I might	10(12.5)	0(0)	12.5	160.000	0.001
	Table tennis					
	Yes	0(0)	80(100)	100		
	No	80(100)	0(0)	0.0		
D	Bicycling				146.826	0.001
	Yes	0(0)	76(95)	95		
	No	70(87.5)	1(1.3)	86.2		
	Don't Know	10(12.5)	3(3.75)	8.75		
E	Bicycling				225.646	0.001
	Yes	0(0)	70(87.5)	87.5		
	No	0(0)	74(92.5)	92.5		
	Don't Know	80(100)	1(1.3)	98.7		
F	I might	0(0)	5(6.3)	6.3	124.444	0.001
	Dancing					
	Yes	10(12.5)	80(100)	87.5		
	No	70(87.5)	0(0)	87.5		
G	Horse back riding				100.714	0.001
	Yes	0(0)	60(75)	75		
	No	60(75)	10(12.5)	62.5		
	Had no experience	15(18.8)	5(6.3)	12.5		
	I might	5(6.3)	5(6.3)	0.0		
2 Do you intend to perform the following activities?						
A	Drive a car				109.000	0.001
	Yes	0(0)	50(78.1)	78.1		
	No	70(87.5)	10(12.5)	75		
	Don't Know	5(6.3)	0(0)	6.3		
	Have no experience	5(6.3)	20(25)	18.7		
B	Gardening or farming				93.205	0.001
	Yes	10(12.5)	70(87.5)	75		
	No	60(75)	5(6.3)	68.7		
	Don't Know	10(12.5)	5(6.3)	6.2		

Alpha level was set at $p < 0.05$

The OTRP did not influence the sexual life of the 25% participants in this study who reported sexual impairment. Sexual dysfunction has been observed among persons with amputation [26-29]. Williamson et al [30] reported up to 76% decreased sexual function following amputation. Ide [29] submitted that rehabilitation professionals do not appear to be sufficiently prepared to deal with the sexual issues of people with a physical disability, although they have recognized the value of discussing them during the rehabilitation process. However, studies on OT intervention in sexual dysfunction in lower limb amputees are scant.

A majority (67%) of the participants in this study demonstrated increased positive attitude towards wearing their prostheses. 75% of the participants wear prostheses all the time following OTRP. A related study by Beekman and Axtell [24] found that 44% of a sample of 23 service users with prostheses wore their prosthesis all day every day and used wheelchairs minimally or not at all. The authors [24] recommend that OTs need to ascertain reasons for non-prosthetic use and refer to the multidisciplinary team as appropriate. COT [15] submits that occupational therapists should take into account the level of amputation, condition of residual limb and prognosis (ability to weight-bear and balance), co-morbidities, cognition, and pre-amputation lifestyle and roles, in order to have a successful individualized prosthetic rehabilitation programmes in lower limb amputation.

Following vocational rehabilitation component of the OTRP in this study, 18.8% of the participants intended to return to their previous occupation before joining the army, 44% wanted to go school while 56.3% desired better jobs. Studies have shown that people with lower limb amputations can have difficulties returning to work [31-33]. Burger and Marinček [31] in a review found return-to-work rate to be about 66%, while between 22 and 67% of subjects with lower limb amputations retained the same occupation, while the remainder had to change occupation. Furthermore, Burger and Marinček [31] reported that many subjects with lower limb amputations have to change their work and/or work only part-time. The percentage of people who returned to the same work as pre-amputation differs in various studies and depends on the type of work and the level of amputation [15]. COT [15] observed that the proportion returning to work varied from 43.5 to 100 %, depending on age, country and cause of amputation. Therefore, vocational rehabilitation is an important aspect of rehabilitation in lower limb amputation.

From this study, there was a positive increase in participants' perception of their ability to participate in sporting activities following OTRP. 98.8% of the participants believed they could play soccer, 75% believed they could swim while 62.5% believed they could drive a car. The outcome of this study showed that the purposeful activities, hobbies and leisure activities that are part of OT improves functional abilities

among persons with amputation [15, 34]. Persons with amputation could participate in a wide range of recreation activities [35] but are faced with limitations such as lack of accessibility, material considerations, functional abilities, affective and social constraints [36]. Available evidence suggests that participation in leisure can foster social interaction and inclusion, and provide a sense of identity [37-39], reduce psychological distress [40], increase self-esteem and confidence [41, 42], and enhance physical health [43]. The positive perception about participation in sports and leisure activities of participants in this study may be an indicator of improvement in their self-efficacy and quality of life following OTRP. This study has some potential limitations. Firstly, it was based on dated data and the outcome tools were not extant. Also, the OT intervention was explored more on its psychosocial impact than physiologic responses. However, to our knowledge, the study is the first occupational therapy intervention research among persons with lower extremities amputation in sub-Sahara Africa.

CONCLUSION

Occupational therapy rehabilitation programme for post-war lower limb amputees who were on prostheses had positive influence on their attitude towards prosthetic use, social and family and perception on return to work, sports and vocation.

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