

# Assessment of the 2 Conventional Physiotherapy Sessions Alone versus One Session Associated to Kabat's Method in the Rehabilitation of Buruli Ulcer Patients (PUB), with Functional Limitations in the District Hospital of Akonolinga, Cameroon

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## Abstract

Buruli ulcer (BU) is a chronic, indolent necrotizing disease of the skin and underlying tissues caused by *Mycobacterium ulcerans*, which may result in functional disability. This disease is the third most frequent infection after leprosy and tuberculosis caused by a mycobacterium. The main objective of this study was to determine comparative effectiveness of conventional physiotherapy alone to its association with Kabat's method in the management of post-Buruli ulcer functional limitations. This was an interventional randomized, comparative and prospective study. It took place at the district hospital of Akonolinga from the 12<sup>th</sup> June to 12<sup>th</sup> September 2016. The study was included, post-Buruli ulcer patients who matched the eligibility criteria, were under treatment in the physiotherapy unit, and who accepted to participate in our study. A questionnaire on the socio-demographic profile of participants, the ulcer localization, the limitation stage, previous medical history and functional mobility assessment scale was administered to the subjects before and after the intervention which lasted for twelve weeks. We had 2 groups: the case group received association of Kabat technique to conventional physiotherapy and the control group received conventional physiotherapy alone. We had 22 patients, 11 patients for the experimental group, 11 patients for the control group. The mean age was 26.18 years, 54.5% of female participation, 68.2% of leg localization, 59.1% patients with severe limitations of func-

tional mobility, and preference for traditional medication 95.5%. After evaluation of efficiency, we concluded that there was no statistically significant difference between the two treatment protocols. Further studies with larger sample size are recommended.

## Keywords

Buruli Ulcer, Functional Limitations, Physiotherapy, Kabat Technique

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## 1. Introduction

The Buruli Ulcer (BU) may be defined as a neighboring chronic infection of the skin and soft tissues having for pathogen *Mycobacterium ulcerans* and whose exact mode of transmission is still unknown [1] [2]. It is one of the 17 neglected tropical diseases (NTD). Several international organizations are engaged to reduce and prevent the related morbidity [3]. Although the mortality due to the BU is low, 66% of subjects with these lesions have a disability to a more or less high degree [2] [4]. The Buruli ulcer evolves in three stages and early physiotherapy could significantly reduce its disability.

The preventive actions of the physiotherapist aim to reduce the pain, fight against edema, maintain or improve joint mobility, the care of the scars, the confection of the splints and the installation of the prostheses [3] [5] [6]. Also, it includes the prescription of the auxiliary means for long-term use, the teaching of the Buruli Ulcer Patients (BUP) and their families of the interventions necessary to take care of themselves, guide healing and improving participation in daily life activities [7] [8] [9]. Membership, the layouts of the splints and active exercises must be part of the early interventions [10] [11] [12].

In Cameroon, a support center was created in each endemic zone of which Akonolinga's District of Praise with a prevalence of the BU estimated at 0.47% [3] [13] [14]. The physiotherapy used for the management of Buruli ulcer patients (BUP) essentially based on basic techniques [15] [16] [17]. We believe that the association of a new technique to the classic basic techniques would be much more beneficial. This is the reason why we wanted to determine the comparative efficiency of conventional physiotherapy alone versus its association to the Kabat technique in BUP functional limitations prevention and care.

The Kabat technique has proven its effectiveness in the management of patients suffering from hemiplegia and wounds related to burns we therefore set ourselves the research hypothesis that conventional physiotherapy associated with the Kabat technique would be more effective than conventional physiotherapy alone on post-Buruli ulcer functional limitations [11] [12] [18].

In order to contribute to improving the management of post-Buruli ulcer functional limitations, we chose to conduct our study at the Akonolinga district hospital for epidemiological reasons. The specific objectives of the study included:

- The description of the sociodemographic characteristics of patients with BU and followed during our study period.
- Description of BU patients by stage of limitation, site of injury and medical history at Akonolinga District Hospital (HDA).

## 2. Material and Methods

We conducted a randomized interventional study; comparative and prospective, during the period from June 12 to September 12, 2016 at Akonolinga District Hospital. We considered all relevant patients (consecutive sampling), who met the inclusion criteria.

Our target population consisted of all BU patients with functional limitations and eligible for physiotherapy admitted to the Buruli Pavilion of Akonolinga District Hospital. Were included all UB patients with functional limitations and excluded any UB patient who interrupted his care before the end of his treatment, any patient with mental disorders preventing him from following our prescriptions, any UB patient with an amputation or with bone deformities that cannot be modified by physiotherapy alone. Data collection is carried out using an observation grid, after having obtained informed consent from Patients with Buruli Ulcer eligible for physiotherapy. For minor subjects, obtained consent from their respective parents. We carried out a random draw among the Patients with Buruli Ulcer presenting post-Buruli Ulcer functional limitations followed in the Physiotherapy department of the Akonolinga District Hospital for the division into two groups.

### Study population

#### ➤ General population

It is made up of all UB patients in the Akonolinga health district

- Target population

It is made up of all UB patients admitted to the Buruli pavilion of the HDA

- Sampled population

It is made up of all UB patients with functional limitations and eligible for physiotherapy, admitted to the HDA UB pavilion.

### Sampling procedure

- Sample selection

We recruited all the patients fulfilling our criteria, and a draw was made for their distribution in each group.

- Eligibility criteria

All Buruli ulcer patients present during our study period.

- Inclusion criteria

All BU patients with functional limitations.

- Exclusion criteria

- Any PUB having interrupted its coverage before the end of its treatment.
- Any patient with mental disorders that does not allow him to follow our prescriptions.
- Any PUB amputated or presenting bone deformities not modifiable by phy-

siotherapy alone.

Data analysis was done using Excel 2007 and Epi info version 3.5.3 software.

### 3. Results and Discussion

We recruited a total of 24 patients and 22 of them responded favorably to the request to participate in the study, *i.e.* a participation rate of 91.66% (22/24).

#### 3.1. Socio-Demographic Characteristics

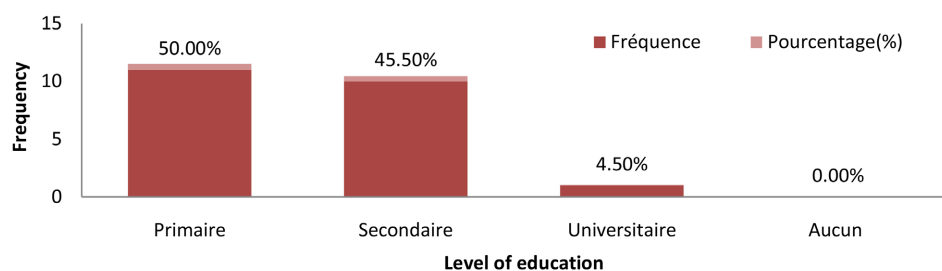
The average age within the studied population was  $26.18 \pm 2$  years, with a minimum of 9 years and a maximum of 48 years. The majority of patients who participated in our study were female, *i.e.* 54.5% with a confidence interval of (40.7% - 82.8%) against 45.5% for males with a confidence interval of (17.2% - 59.3%). This value is close to that of the WHO which is 52%. This could be explained by the fact that the woman in her activities remains in regular contact with contaminated water. Regarding marital status, most of the patients who participated in our study were single, that is 63.63% (14/22) with a confidence interval of (13.9% - 68.4%). Concerning the professional situation, the majority of the participants in our study did not have an income generating activity, that is 72.72% (16/22), with a confidence interval of (25.1% - 80.8%). This result is similar to that of Marston et al who obtained 63% in a study conducted in Ivory Coast. Regarding the level of education, the most predominant was the primary level at 50% (11/22) with a confidence interval of (28.2% - 71.8%), as shown in **Figure 1**.

The majority of patients are fishermen or sand collectors in the water. The most common location of wounds is in the lower limbs (foot in water). The juxta articular forms heal with joint stiffness and therefore a functional limitation. The contamination cycle of this disease remains unknown to this day and it is one of the neglected tropical diseases.

The predominance of the level of primary education would probably be linked to the fact that it is a rural area where work in the fields occupies a fairly important place in the activities of the inhabitants.

#### 3.2. Identification of Site of Injury, Stage of Functional Mobility Limitation, and Treatments Received by Patients Prior to Study Start

Most of the participants in our study had localized lesions in the lower limb,



**Figure 1.** Distribution of patients by level of education.

*i.e.* 68.2% (15/22) with a confidence interval of (45.1% - 86.1%) This frequent localization of lesions in the lower limb allows us to confirm other studies showing that lesions on the lower limbs are twice as common as those on the upper limbs (The Uganda Buruli Group, 1971 [4] [9]). With regard to the stage of limitation, we realize through **Table 1** that most of the patients at the start of the study were at the stage of severe functional mobility, *i.e.* 59.08% with a confidence interval of (27.1% - 86.2%).

This high frequency of the severe mobility stage at the start of the study would be linked to the late presentation of patients with extensive lesions that could be the cause of severe disabilities [19].

With regard to the therapeutic itinerary, we find that the number of patients who have undergone treatment in traditional medicine is higher than in the health center, *i.e.* 95.5% with a 95% confidence interval of (77.2% - 99.9%) as presented in **Table 2**.

This high percentage of patients with a preference for the traditional treatment could be explained by the representations of the causes of the disease, since most of the inhabitants believe that Buruli Ulcer is a mystical disease and therefore cannot be treated in a hospital but rather traditionally. Similarly, we could also mention the socio-economic situation of patients, which does not allow them to buy antibiotics, monitor dressings or pay the hospitalization package.

Regarding the type of medical intervention, we find that all the patients received antibiotic therapy as well as dressings, *i.e.* 100%, with a confidence interval of (100.0% - 100.0%). In addition, no patient underwent amputation. The results are shown in **Table 3**.

**Table 1.** Distribution of patients according to the stage of limitation of functional mobility.

Limiting stage	Protocol 1		Protocol 2		Total		95% confidence interval
	Frequency	(%)	Frequency	%	Frequency	%	
<b>MASF</b>	7	31.81%	6	27.27%	13	59.08%	[27.1% - 86.2%]
<b>MACF</b>	3	13.65	4	18.18%	7	31.83%	[8.45% - 65.1%]
<b>MAMF</b>	1	4.54%	1	4.54%	2	9.1	[0.2% - 41.3%]
<b>Total</b>	11	50%	11	50%	11	100.0%	

**Legend:** **MASF:** Mobility severely affecting function, **MACF:** Mobility considerably affecting function, **MAMF:** Mobility moderately affecting function.

**Table 2.** Distribution of patients according to therapeutic route.

Previous treatment	Health center			Traditional medicine		
	Frequency	%	95% CI	Frequency	(%)	95% CI
<b>Yes</b>	16	72.7	[49.8% - 89.3%]	21	95.5	[77.2% - 99.9%]
<b>No</b>	6	27.3	[10.7% - 50.2%]	1	4.5	[0.1% - 22.8%]
<b>TOTAL</b>	22	100		22	100	

**Table 3.** Distribution of patients according to the medical intervention received.

Previous medical interventions	Antibiotic therapy		Bandages		Graft	
	Frequency	%	Frequency	%	Frequency	%
YES	22	100	22	100	7	31.8
NO	0	0	0	0	15	68.2
<b>TOTAL</b>	22	100	22	100	22	100

### 3.3. Evaluation of the Effect of Protocols on Functional Limitations

Among the patients with severe functional mobility limitations (**Table 4**), those who passed to the considerable functional mobility stage are more numerous in protocol 1 than in protocol 2. On the other hand, we note that those who moved to the moderate functional mobility stage, are more numerous in protocol 2 than in protocol 1. These results are presented in.

Complete functional mobility stage are more numerous in protocol 2 than in protocol 1. These results are presented in **Table 5**.

Through **Table 6**, it is noted that the number of participants having an improvement in functional mobility limitations from the moderate stage to the complete mobility functional stage is the same for the two protocols.

Improved support not statistically significant, likely due to small sample size what is the comparative effectiveness of conventional physiotherapy alone compared to its association with the Kabat technique on the prevention and treatment of post-Buruli ulcer functional limitations?

Among the 22 patients who responded favorably, 11 patients were recruited in each of the groups. We had an average age of 26.18 years, with a female predominance of 54.5%, most patients were at the stage of severe functional mobility limitation (59.1%), patients had a preference for medicine traditional (95.5%), and the lower limb was the most affected by the lesions (68.2%). After evaluation, it appears that there is no statistically significant difference between the effectiveness of conventional physiotherapy alone and its association with the Kabat technique. A study on a larger sample should be done.

**Table 4.** Progression of patients from the MASF stage.

Protocol	Beginning		MACF		MAMF		Unevolved	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
<b>Protocol 1</b>	7	100%	2	28.57	2	28.57	3	42.86
<b>Protocol 2</b>	6	100%	1	16.67	3	50	2	33.33

**MASF:** Mobility severely affecting function, **MACF:** Mobility considerably affecting function, **MAMF:** Mobility moderately affecting function. **Protocol 1:** 15 minutes classic physiotherapy session + 15 minutes classic physiotherapy session; **Protocol 2:** 15 minutes classic physiotherapy session + 15 minutes of Kabat method.

**Table 5.** Progression of patients from the MACF stage.

Protocol	Beginning		MAMF		Complete mobility		Unevolved	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
<b>Protocol 1</b>	3	100%	2	66.67	0	00	1	33.33
<b>Protocol 2</b>	4	100%	1	25	3	75	0	00

**MASF:** Mobility severely affecting function, **MACF:** Mobility considerably affecting function, **MAMF:** Mobility moderately affecting function. **Protocol 1:** 15 minutes classic physiotherapy session + 15 minutes classic physiotherapy session; **Protocol 2:** 15 minutes classic physiotherapy session + 15 minutes of Kabat method.

**Table 6.** Distribution of patients at the MAMF stage according to progression.

Protocol	Beginning		Complete functional mobility	
	Frequency	%	Frequency	%
<b>Protocol 1</b>	1	100%	1	100
<b>Protocol 2</b>	1	100%	1	100

**MASF:** Mobility severely affecting function, **MACF:** Mobility considerably affecting function, **MAMF:** Mobility moderately affecting function. **Protocol 1:** 15 minutes classic physiotherapy session + 15 minutes classic physiotherapy session; **Protocol 2:** 15 minutes classic physiotherapy session + 15 minutes of Kabat method.

## 4. Conclusion

The 2 protocols are effective especially for moderate disabilities. The second one seems more effective to restore complete functional mobility but our sample size is too small to tell if there is any statistically significant difference between the two. We recommend continuing our study with larger sample size in order to improve the significance of our results.

## Conflicts of Interest

The authors declare no conflict of interest.

## Contribution of the Authors

**Data collection:** Dr DIKONGUE D. FRED; **Writing of the case:** Dr DIKONGUE/ Dr ATEMKENG; **Proofreading:** other authors.

The authors have read and approved the final version of the manuscript.

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