Therapeutic survey on traditional treatment of Buruli ulcer in Côte d'Ivoire

Trébissou Jonhson Noel D.1*, Bla Kouakou B.1, Yapo Adou F.1, Yapi Houphouet F.1 and Djaman Allico J.1,2

1Pharmacodynamics Biochemical Laboratory, UFR Biosciences, Felix Houphouet Boigny University, Abidjan 22-Côte d’Ivoire
2Laboratory of Basic and Clinical Biochemistry, Pasteur Institute of Côte d'Ivoire, Abidjan

ABSTRACT

To investigate wound healing evolution in Buruli ulcer after receiving traditional treatment conducted in three centers in Côte d'Ivoire. Selection of some plants used by patients to treat ulcers caused by Mycobacterium ulcerans. We then compared their ulcer healing effects. 78% (273 people) of patients used medicinal plants to treat their wounds. 219 people (80%) had their wounds healed, 41 people (15%) had ulcer wound stabilized and 5% (13 people) have felt no effect after treatment. This study will help find a cure for Buruli ulcer, which is a real public health problem in Côte d'Ivoire.

Key words: Buruli ulcer, Mycobacterium ulcerans, Côte d'Ivoire.

INTRODUCTION

Buruli ulcer is a disease not well known that is caused by a bacterium called Mycobacterium ulcerans. This bacteria by destroying large areas of skin and sometimes bone tissue, causes an awful looking appearance and disable [1]. Buruli ulcer is most often found in tropical and swampy rural areas, close to stagnant water [2].

The mode of transmission of M. ulcerans is still the subject of controversy. If there is no direct transmission from man to man [3, 4]. It is found in sub-Saharan Africa where children and women are more often affected than men. In these areas, the prevalence is much higher especially along the Gulf of Guinea where the disease is rapidly expanding [5, 6]. The three major endemic countries are Ghana, Benin and Côte d'Ivoire [7, 8]. Since 1997, almost all regions of Côte d'Ivoire are affected by this disease and up to 16% of the population of some villages are affected [7]. Moreover every year, caring centers registered an increasing number of new cases [9, 10]. Treatment management is very expensive and remains inaccessible to most patients. This disease represents a significant financial burden to both patients and health authorities. This worrying situation reflects a real and serious public health problem in Côte d'Ivoire [11, 12].

WHO recommends for the treatment of Buruli ulcer, the combination of antibiotics as first-line treatment and the use of surgery as second-line treatment. However relapses are observed after treatment in both cases [13, 7].

African floristic heritage is very rich in medicinal plants whose effectiveness is well proven, in fact, it was recorded on the continent more than 5000 medicinal plants species [14]. Concern for the efficient exploitation of this heritage has attracted a lot of research work in other to provide bases of scientific actions of these plants [15]. The plants are used in the treatment of many diseases (digestive, oral, lung, skin and liver infection ect..) [16].
With our phytomedicinal knowledge, we would scientifically select plants that can cure this disease. We would compare the effects by conducting a therapeutic survey of the traditional treatment of Buruli ulcer in Côte d'Ivoire. Our goal is to find a cure against this disease.

**MATERIALS AND METHODS**

**Place of study**
This study was conducted in three Buruli ulcer caring and management center of they are: Raoul Follereau Institute Adzopé (southeast), the Kongouanou health center (central) and saint Michel health center Zoukougbeu (center west). These centers are located in three regions identified as endemic areas.

**Target population**
They are people (men, women and children) who had skin lesions clinically suggestive of Buruli ulcer.

**Instruments used**
To properly conduct this study, we have used the following instruments: questionnaires and a camera.

**Plant material**
The plant material consists of several plants that have been identified by an expert from the National Floristic Centre Côte d’Ivoire, where each plant sample are being kept.

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Scientific Name</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attédé</td>
<td>Ricinus communis</td>
<td>Euphorbiaceae</td>
</tr>
<tr>
<td>Tobacco</td>
<td>Nicotiana tabacum</td>
<td>Solanaceae</td>
</tr>
<tr>
<td>Mango bark</td>
<td>Mangifera indica</td>
<td>Anacardiaceae</td>
</tr>
<tr>
<td>Idjré</td>
<td>Mariscus alternifolinus</td>
<td>Cyperaceae</td>
</tr>
<tr>
<td>Koumonssi</td>
<td>Solanum rugosum</td>
<td>Solanaceae</td>
</tr>
<tr>
<td>Papayas</td>
<td>Carica papaya</td>
<td>Caricaceae</td>
</tr>
</tbody>
</table>

**Preparation method of treatment plants**

**The maceration**
The Attédé leaves (Ricinus communis) and tobacco (Nicotiana tabacum) were pressed in the palms and the substance obtained was applied to the wound twice a day.

**Infusion**
The leaves and roots of mango (Mangifera indica) and papaya (Carica papaya) were heated and applied to the wound twice a day.

**Powder**
Koumonssi Leaves (Solanum rugosum) were dried under shade for two weeks. The powder obtained after grinding was applied to the wound twice a day.

**Experimental approach**
After the usual formalities with center officials, we proceeded to visiting the premises and counting of Buruli ulcer patients to familiarize with patients and facilitate our study. Each patient was subjected to the questionnaire in order to collect useful information. This is done under the supervision of a center official to allay fears that may arise in some patients. The interview with patients was made after the daily dressings of wounds to avoid stressing patients as they develop stress during these sessions. During dressings and surgical interventions, photos were taken for the needs of our study. The last days of our stay were generally devoted to officials and nurses in other to learn about current treatments used and gather more useful information about the center.

**Statistical Analysis**
To process the data collected, we used a computer software program Epi Info version 6. Working at the simplest level, we have computerized our questionnaire, entered questionnaire data and capture and analyze data to produce lists, frequencies, cross tabulations, averages, graphs and statistical result.
RESULTS

Nature of treatment
On a set of 350 patients interviewed, all from the three caring centers. Figure 1 shows that 78 % (273 patients) of these people have used a herbal treatment against 22 % (77 patients) who did not use plants to treat their ulcers caused by Mycobacterium ulceran.

![Figure 1: Type of treatment used](image)

Result obtained from Plant based treatment
Figure 2 shows that of the 273 patients (78 %) who used plant treatment;
80% (219 people) had their wound healed
15% (41 people) had their wound stabilized
5% (13 people) had no effect on their wound.

![Figure 2: Results from plants based treatment](image)

Plants used in the treatment
Table II summarizes all the plants used by patients to treat ulcers caused by M. ulcerans. These plants caused either healing or stabilization of wounds.
The results of our investigation were revealed by several research teams who worked on the active principles contained in plant extracts [16]. Antibacterial activities of total flavonoids of *Thonningia sanguinea* were evaluated in vitro on three strains of the genus *Staphylococcus*, a reference strain (*Staphylococcus aureus* ATCC 25923) and two clinical hospital strains (*Staphylococcus aureus* methyl-S and *Staphylococcus aureus* methicillin -R). The three strains tested were sensitive to total flavonoids of *Thonningia sanguinea* [17]. These same results were also reported by research work on in vitro evaluation of the antimicrobial activity of aqueous extracts of *T. sanguinea*, a plant used in traditional medicine to treat skin infectious diseases in Côte d’Ivoire, on *C. neoformans*. The results showed that *Cryptococcus neoformans* was sensitive to total aqueous extracts of *T. sanguinea* with concentrations for 50% inhibition of 0.06 mg / ml [18]. Studies on *Terminalia glaucescens*, exotic medicinal plant used in Côte d'Ivoire in the treatment of infectious diseases. It was revealed that, aqueous and organic extracts of the leaves of this plant were tested for their activity on *Salmonella typhi* and *S. typhimurium*. The results showed that the fraction with ethyl acetate is the most active, on *S. typhimurium* ATCC 14028 with a Minimum Inhibitory Concentration and Minimum Bactericidal Concentration of respectively : 2.5 mg / ml and 5 mg / ml [19].

These observations show that our continent is well endowed with multitude of plants which contain very effective active ingredients. This justifies the use of plants in traditional medicine in the treatment of several pathologies [20].

**DISCUSSION**

The aim of our study was to investigate the traditional treatment of Buruli ulcer in Côte d'Ivoire. We have selected some plants used by patients to treat ulcers caused by *Mycobacterium ulcerans*. 78% (273 people) of patients used treatments based on medicinal plants to treat their wounds. Of the 273 persons, 219 persons (80 %) had their wounds healed ,41people (15 %) had their wounds stabilized 5% (13 people) have felt no effect after herbal treatment. The survey revealed that extracts of *Ricinus communis* and *Mariscus alternifolinus* have substances that stabilize the wounds against extracts of *Nicotiana tabacum*, *Mangifera indica*, *Solanum rugosum* and *Carica papaya* have antimycobacteriennes properties.

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**CONCLUSION**

Therapeutic survey on the traditional treatment of Buruli ulcer in Côte d'Ivoire has allowed us to select some plants that have antimycobacterial effects. This could help in finding a cure against this disease that constitute a real public health problem in Côte d'Ivoire.

**REFERENCES**


