# Health-Related Quality of Life of Adult Patients Healed from Buruli Ulcer in Benin

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*Authors' contributions*

*This work was carried out in collaboration between all authors. Authors TGK and GMH designed the study and wrote the protocol. Author GS gave access to patient records. Authors EG and HA assisted by author JC-C collected the data. Authors TGK, GMH, AE and DN analyzed the data, GMH wrote the first draft of the manuscript. All authors read and approved the final manuscript.*

## ABSTRACT

**Background:** The implementation of the antimicrobial therapy greatly improved Buruli Ulcer (BU) care. Nevertheless, the disease still imposes significant burden. In rural endemic areas, many patients are being healed from the disease with disabling sequels. They are living without social assistance in a context of poverty. Various researches have evaluated the therapeutic modalities that are used to control the BU disease, but any study on the quality of life (QOL) of the patients healed from BU has been reported.
**Methodology/Principal Findings:** A total of 105 patients healed from Buruli ulcer and, 105 control

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subjects without Buruli ulcer history are enrolled in the study after giving well-informed consent. The Medical Outcome Study Short Form (SF-36) is administrated to access their QOL. The study is approved by the Ethical committee of the Faculty of Health Sciences of the University of Abomey-Calavi (UAC). All the patients have a weak QOL than control subjects. The deterioration affects their physical functioning, their physical role, their emotional role and their mental health (p<0.05). However, in spite of their low QOL, subjects aged from 40 years old and over (p = 0.003), and subjects married, divorced or widowed (p = 0.01) work physically better than the other sub-groups, even if they are mentally weaker. In a Spearman correlation test, we have observed significant relationships of socio-economic variable with the decrease of SF-36 subscale values.

**Conclusion/Significance:** BU patients are healed in a long-term physically and psychologically marked by the sequels induced by the disease. The results of the present study suggest that interventions and supports are needed to improve the QOL of these patients.

## 1. INTRODUCTION

Buruli ulcer (BU) is a disease caused by a pathogen called *Mycobacterium ulcerans*. This pathogen produces a highly potent exotoxin named mycolactone which plays the main role in the pathogenesis of the disease [1,2]. This toxin provokes skin necrosis, progresses to underlying tissues such as muscles and tendons and leads to chronic inflammatory response and myofiber damage followed by a lack of tissue regeneration [3]. About fifteen years now, BU disease has retained attention of the international scientist community whose work has improved the epidemiologic and the therapeutic monitoring of the disease. In particular, the implementation of the antimicrobial therapy greatly improved BU care [4-7]. Nevertheless, the disease still imposes a significant burden by causing an important physical impact with a long period of treatment and a high financial cost [6,8]. A recent study showed that 53% of BU patients followed at hospital undergo surgical excision and skin grafting [5]. The surgical treatment, the chronic inflammatory response and the inappropriate skin and muscle regeneration involve contracture, atrophy, fibrosis, loss of muscle function and permanent functional disabilities [3].

According to the International Classification of the Functional Disability and Health, people with functional disabilities can have limited social participation and activity [9-11]. The social participation means involvement in life situation such as accomplishment of the daily activities and the taking of active roles in the community, whereas activities refer to the individual's ability to accomplish a task. The two concepts are important variables of the health-related quality of life (HRQOL). The definition of this concept varies according to the socio-cultural background and the politico-economic contexts. However, the HRQOL mainly refers to the consequence of the dysfunction causes by illness status, medical treatment, and health care policy [12]. The concept encompasses objective and subjective sight of health and well-being [13]. The objective aspect focuses on the measure of some indicators of social participation or personal integration mainly access to education or work: i.e. facility of mobility, or ability to establish relationship, and, to take social role. On the other hand, the subjective aspect evaluates coincidence between the patient's expectations, his wishes and his realizations.

Nowadays, HRQOL value is clearly established as an important final point in medical care. Nevertheless, in spite of various therapies that were investigated to control BU disease, no study on quality of life (QOL) of the patients healed from BU has been reported. This lack of information may limit physicians and national health care planners into their choice of a therapeutic approach that ought not only to heal the disease but also to improve the patient's QOL.

The present study aims at measuring the HRQOL of adult patients healed from BU by using the Medical Outcome Study Short-Form (SF-36).

## 2. MATERIALS AND METHODS

### 2.1 Ethics Statement

The study was approved by the Ethical committee of the Faculty of Health Sciences of the University of Abomey-Calavi (FSS/UAC) and the National Buruli Ulcer Control Program. Each participant and if the participant was under 18

years old, both him/she and his/her parents, are informed of the nature and aims of the study. They are also informed that participation is voluntary and that they could withdraw themselves from the study at any time. Oral consent is documented by the presence of a witness and noted in the patient's medical record. The use of oral consent is approved by the ethical review boards because the majority of the study participants cannot read and write. All the participants give well-informed consent. All the data analyzed are anonymized.

## 2.2 Study Area and Population

This cross-sectional study is carried out at the medical zone of Allada Center of screening and treatment of Buruli Ulcer (CDTUB). Allada medical area is an agricultural and a fishing zone. It is characterized by depression, slopes and crevasse. It is one of the most endemic regions for BU in the southern Benin, a country where around 1000 new cases of BU are discovered per year [14]. As rural region, Allada medical area shares many socio-economic characteristics with the impoverished rural communities of the others developing countries.

## 2.3 Subjects and Study Design

Patients' personal information and health status are firstly accessed from their file in the archives of the CDTUB. The eligibility criteria are as follows: 1) to have been healed from BU disease from 2005 to 2009; 2) to be aged over 15 years at the beginning of the study; 3) to live within a radius of 100 km from the CDTUB; 4) to give consent freely. Exclusion criteria are: 1) - preexisting of traumatism or poliomyelitis sequels, 2) - presence of other acute or chronic disease.

A total of 244 patients were declared healed from BU from 2005 to 2009; 105 of them were eligible for all criteria; the 139 other were ineligible for at least one of the criteria among them, 138 were aged less than 15 years old at the study onset and 1 were outside the radius of 100 km from the CDTUB of Allada. The selection criteria of the control subjects are as follows: 1) the subject must not have a BU history, 2) he must be aged over 15 years old and, 3) he must live in the same rural area. Following these criteria, 105 control subjects, were enrolled in the study after they have given consent freely. A pre-test was conducted in January 2010 and necessary amendments had been made and the investigator was trained. Then, all of the patients

were retrieved and the Medical Outcome Study Short Form (SF-36) questionnaire was administered from March to May.

## 2.4 Instrument and Data Collection Procedure

We used the French version of the SF-36. We chose the SF-36 because it is one of the generic tools of HRQOL most used to measure the physical and the mental functioning. It has also been shown to be valid and reliable in different populations [15-18]. The SF-36 is composed of 36 questions that collect the health status of patients throughout physical and emotional dimensions. Two main scores are often used for the interpretation. The Physical Component Score (PCS) which is the sum of Physical Functioning (PF), Physical Role (PR), Body Pain (BP) and General Health (GH) appreciate the patient's physical ability, whereas the Mental Component Score (MCS) composed of the total score obtained for Vitality (VT), Social Functioning (SF), Emotional Role (ER) and Mental Health (MH) gives information about the patient's mental status. Since this study took place in a rural zone, before administrating the SF-36 questionnaire, a contextualization of two items of the Physical Functioning was made. Instead of climbing several flights of stairs (3.d) and climbing one flight of stairs (3.e), we respectively used climbing the ladder of the silo and climbing a steep slope. In order to ensure that these items measure effectively the participants' physical health, we have chosen to evaluate simultaneously with the physical functioning of the SF-36, some specific activities daily performed by the community. These activities are: ploughing/weeding (PW); fishing/swimming (FS); getting into canoe (GIC); paddling (Pdl); and use upright pole to lead a canoe (UPLC).

By appointment, the investigator goes to the subject's village and meets him in his own house in a relaxed condition. Then he explains the procedure and invites the subject to fill up the SF-36. Since the literacy rate of adults in the Republic of Benin turns around 42%, people answered the questionnaire through interviews. The full time needed to complete the questionnaire by the subject was 45 to 60 minutes.

## 2.5 Data Analysis

The data were entered into a database and checked for data acquisition errors. The SF-36

subscales and specific activities scores were calculated. Then, data were analyzed by using Statistical Package for Social Sciences version 12.0 (SPSS Inc., Chicago, Illinois). Differences between Socio-economic characteristics of the patients and the controls were evaluated by using t-test. To check whether the factor structure of SF-36 holds in the study population and to evaluate the validity of SF-36, we performed an exploratory factor analysis and calculated Pearson correlation coefficients on the scores of the specific activities with the SF-36 subscales. Correlations less than 0.30 were defined weak; 0.30 - 0.59 were defined moderate, and 0.60 and over were defined strong [19]. We presume a strong correlation of specific activities with the physical domain of SF-36. The comparison of SF-36 subscales and summaries (PCS, MCS) between patients and control, within socio-economic variables and within clinical characteristics was made by Wilcoxon signed-rank test. The relationships between SF-36 and patients' socio-economic variable and the clinical characteristics were assessed by using Spearman's Rho correlation test. *P* values <0.05 were considered significant.

## 3. RESULTS

### 3.1 Socio-Economic and Clinical Characteristics of the Participants

The average age was 31.82 and 32.21 years old for both the patients and the control subjects respectively. One patient out of two was aged between 20 and 40 years; 69.52% were women and 70.48% were married or cohabiting (Table 1). The data indicated also that 40.95% of the patients were literate; 40% were farmers/fishermen and one woman in five was housewife. More than a half of the lesions were located on the lower limbs (53.30%). Likewise, the socio-economic characteristics of the control subjects are approximately similar to those of the patients (Table 1; P>0.05).

### 3.2 HRQOL in Patients Healed from BU

The Fig.1 shows the comparison of the SF-36 subscale scores, the PCS and MCS values and the score of specific activities obtained by the patients healed from BU and the control subjects. All the values of the patients are significantly lower than those of the control group. For example, the patient's physical functioning was 51.46 and their mental health was 28.60;

whereas the control's physical functioning and mental health scores were respectively 85.16 and 66.90. In addition, the level of the patients' ability to do specific activities was ranged from 24.95 to 30.86. These values were significantly lower than those of the control subjects which were ranged from 70.12 to 87.08. The Fig. 2 shows that several values of SF-36 subscales of patients were fewer than 50%.

### 3.3 Influence of the Socio-Economic Characteristics and the Clinical Status of the Patients on the Levels of Their PCS and Their MCS

In general, all the values of PCS and MCS of the patients were low (Table 2). Men's PCS and MCS were respectively 47.85 and 42.76. These values were slightly higher than those of the women's but there was not any significant difference of PCS between men and women (p = 0.78). In addition, subjects aged more than 40 years old have a PCS significantly different from the less aged subjects (p = 0.003) but they showed a lower MCS than subjects aged from 15 to 20 years (p = 0.004). The Table 2 showed also that PCS of illiterate patients was significantly different from literate once, nevertheless no difference in the MCS status for the two subgroups was found. Regarding employment, farmers/fishermen and housewives have a PCS significantly higher than the other professions. However, it is only pupils who have the MCS level significantly higher than all other subgroups of patients. Similar differences were observed in the control group except for the MCS of the students that is not significantly higher than those of other sub-groups of the controls (data not shown).

We had also evaluated the impact of the location of the lesion and the age of the patients at the beginning of the disease on their HRQOL. The PCS of the patients whose lesion was located on the lower limbs was significantly higher than the other groups. Moreover, the patients aged more than 40 years at the beginning of the disease have showed a PCS level significantly different from the other age groups. Although, the MCS of all the subgroups were under 50% (Table 2), pupils, subjects aged from 15 to 20 years old at beginning of the disease, subjects aged over 40 years and subjects who were unmarried had shown a level of mental health significantly different from the other groups of their categories.

**Table 1. Socio-economic and clinical characteristics of the study population**

| Age at the study onset (year)* | BU (n = 105) Mean ± SD or freq (%) | Control (n = 105) Mean ± SD or freq (%) |
|---|---|---|
| | 31.82 ±13.01 | 31.74 ± 12.05 |
| [15-20] | 21 (20.00) | 23 (21.90) |
| [20-40] | 53 (50.48) | 55 (52.38) |
| >40 | 31 (29.52) | 27 (25.71) |
| **Sex*** | | |
| Female | 73 (69.52) | 60 (64.76) |
| Male | 32 (30.48) | 45 (42.86) |
| **Marital Status*** | | |
| Unmarried | 23 (21.90) | 30 (28.58) |
| Married | 74 (70.48) | 68 (64.76) |
| Divorced/Widowed | 8 (7.62) | 7 (6.67) |
| **Literacy*** | | |
| Literate | 43 (40.95) | 48 (45.71) |
| Illiterate | 62 (59.05) | 57 (54.28) |
| **Employment*** | | |
| Pupil | 15 (14.29) | 17 (16.19) |
| Trainee | 7 (6.67) | 9 (8.57) |
| Farmer/Fisher | 42 (40.00) | 40 (38.10) |
| Worker/Craftsman | 12 (11.43) | 11 (10.48) |
| Housewife | 17 (16.19) | 12 (11.43) |
| Other professions | 12 (11.43) | 16 (15.24) |
| **Location of the lesion** | | |
| Lower limbs | 56 (53.33) | NA |
| Upper limbs | 38 (36.19) | NA |
| Other locations | 11 (10.48) | NA |

*We considered "literate", any subject who completed primary school (6 years of schooling) and "other professions", civil servant, teacher, trader and business men. We called "other locations" of BU lesions, multiple locations and locations on the trunk or on the face. Freq = frequency, (%) = percentage; SD = standard deviation.*
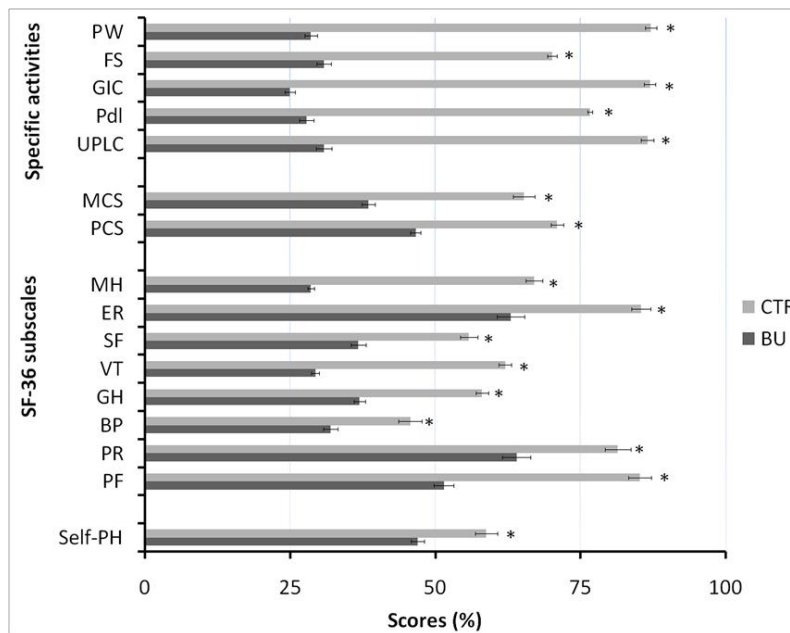*\* T test: P > 0.05, no significantly different.*



**Fig. 1. The profile of SF-36 and the level of Specific activities in adult patients healed from BU and in control subjects.**
*All the values of the patients (BU) were lower than those of control subjects (CTR).*
*\* Significantly different from BU; P<0.05*

**Table 2. Crossed analysis of physical and mental health of the adult patients healed from BU**

| | | PCS | | MCS | |
|---|---|---|---|---|---|
| | | Mean ± SD | P values | Mean ± SD | P values |
| **Sex** | | | | | |
| | Female | 46.04±12.97 | 0.784 | 36.61±8.63 | 0.002 |
| | Male | 47.85±16.35 | | 42.76±8.77[a] | |
| **Age at the study onset** | | | | | |
| | [15-20] | 40.24±10.72 | | 46.46±4.72[ab] | 0.0001 |
| | [20-40] | 43.29±12.88 | | 33.69±7.57 | |
| | >40 | 56.56±13.81[a] | 0.003 | 41.29±8.85[a] | 0.004 |
| **Marital status** | | | | | |
| | Unmarried | 37.10±8.82 | | 43.04±9.26[a] | 0.003 |
| | Married | 48.66±14.37[a] | 0.0001 | 36.64±8.60 | |
| | Divorced/Widowed | 54.79±10.10[a] | 0.01 | 42.50±7.72 | |
| **Literacy** | | | | | |
| | Literate | 40.29±10.08 | | 39.60±8.51 | |
| | Illiterate | 51.83±14.12[a] | 0.003 | 38.57±9.20 | 0.876 |
| **Employment** | | | | | |
| | Pupil | 39.63±10.19 | | 46.57±4.42[a] | 0.003 |
| | Trainee | 36.58±10.05 | | 36.73±11.46 | |
| | Farmer/Fisher | 51.76±16.01[ab] | 0.041 | 32.14±9.33 | |
| | Worker/Craftsman | 40.63±10.53 | | 34.88±8.11 | |
| | Housewife | 49.23±12.95[a] | 0.030 | 35.37±8.33 | |
| | Other profession | 45.31±10.46 | | 35.12±7.69 | |
| **Location of the lesion** | | | | | |
| | Lower limbs | 50.26±13.77[a] | 0.013 | 37.85±8.83 | |
| | Upper limbs | 42.79±13.18 | | 39.96±9.49 | 0.593 |
| | Other location | 41.09±14.83 | | 38.70±10.22 | |
| **Age at the beginning of the disease** | | | | | |
| | [0-15] | 38.29±10.08 | | 46.62 ± 7.79[a] | 0.006 |
| | [15-20] | 47.14±13.36 | | 36.30 ± 6.68 | |
| | [20-40] | 45.98±13.93[a] | 0.020 | 35.74 ± 9.20 | |
| | >40 | 54.24±14.00[ab] | 0.0001 | 39.42 ± 9.05 | |
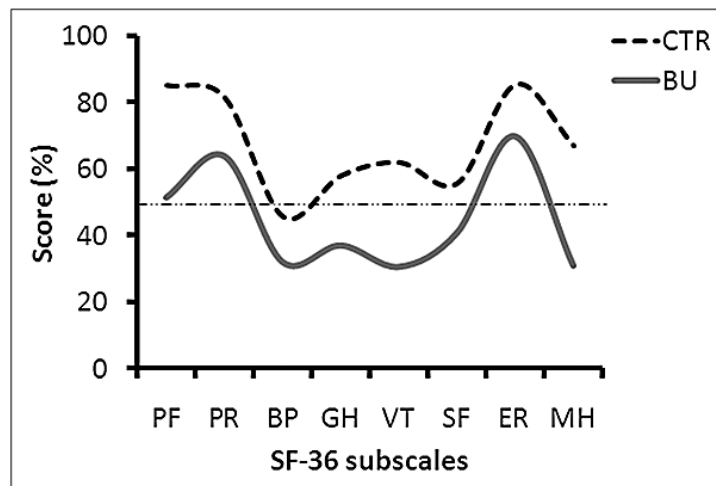


**Fig. 2. Quality of life level measured by the medical outcome study SF-36.**
*Curve of health status were showed by SF-36 subscales for subjects healed from Buruli ulcer (BU) and control subjects (CTR). The curves are similar, though all the values reported for the patients are entirely below the CTR curve.*

## 3.4 Relationship of the Socio-economic and the Clinical Characteristics of the Patients with Their SF-36 Subscale Values

The correlation was ranged from weak to moderate (Tables 3 and 4). Contrary to what was expected, no correlation of the sex with the physical domains and PCS was found. The female sex was correlated negatively with the mental health and the MCS. The patient's age at the beginning of the disease was positively associated to the physical health and the PCS but negatively associated to the social functioning and the mental health. In addition, traditional treatment has negative effect on the physical functioning, the physical role and the PCS. The data of the Tables 3 and 4 have also showed that, the mobility has positive effect on the level of physical and the mental health of the patients. In other word, the more the patient has conserved his mobility, the better is his QOL. We also tested the correlation of the PCS with the MCS and we observed that, the PCS was moderately correlated with MCS at level 0.01; (r (105) = 0.51; p = 0.001). The Figs. 3 and 4 showed the distribution of the subjects respectively by the level of the PCS and the MCS.
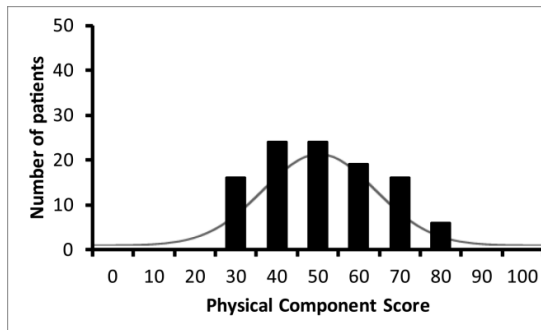


**Fig. 3. Distribution of the patients by physical health status**.
*The frequency of the patients by physical component score is showed. The patients are gathered around the mean in a normal distribution and one patient out of 3 has a score of physical health over 50%.*

## 3.5 Factor Analysis

An exploratory factor analysis was performed using all of participants (patients and control subjects). The Kaiser–Meyer–Olkin (KMO) measure of Sampling Adequacy and the Bartlett Test of Sphericity are respectively 0.84 and 1559.74 (*P* <0.001). We used the principal

components analysis with varimax in order to identify the minimum number of factors needed to account for the maximum amount of variance. The Factor analysis has revealed two factors with an Eigenvalue greater than 1.0. The total of variance explained by the two factors was 76.87%, which was consistent with that found by Ware and colleagues [20]. The Table 5 shows the factors pattern matrix for SF-36; factors loading > 0.05 are considered significant.
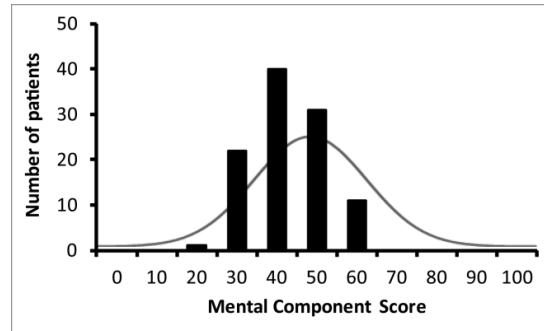


**Fig. 4. Distribution of the patients by mental health status**.
*The frequency of the patients by mental component score is showed. The patients are gathered around the mean in a normal distribution. In addition, about nine patients out of ten have obtained a score of mental health less than or equal to 50%.*

## 3.6 Reliability and Validity

Alpha Cronbach was 0.899; which showed high internal consistency. The Pearson correlation coefficients relating the specific activities and the SF-36 subscales are shown in Table 5. Each item significantly correlated with the specific activities (p < 0.0001). As expected, all the items of the physical health domains of the SF-36 have strong correlation with specific activities. The physical functioning and the physical role have the highest correlation with a Pearson correlation coefficient r >0.73.

## 4. DISCUSSION

The socio-economic characteristics of the patients healed from BU are similar to those of other rural people in Benin. They are in majority illiterates, at the age of full activity [21], farmers and married. Their youth would result in the fact that the disease affects more young people [22]. BU can locate anywhere on the body and causes important damage. However, lower limbs are more frequently involved than upper limbs [21,22], and multiple sequels as well as the

sequels on the upper limbs, affect more negatively achievement of the daily activities since the levels of the physical and mental health of these patients were low.

This study shows that patients healed from BU have low self-perceived health, presence of a body pain, a weak ability to do their daily job and a low vitality. The sickness exposed patients to a psychological stress mainly to a low self-esteem, anxiety, depression [23] and a loss of hope. Our results are consistent with other results obtained in various illness states [24-26]. Pain can considerably limit physical activity and enhance mental health decreasing [26,27]. BU lesion is painless at the beginning of the disease because of detrimental effect of mycolactone on the nerves [28] but becomes painful with treatment in particular after stripping that denudes the nerve endings and exposes them to the noxious stimuli. The pain point out by the patients may result from the painful experience of BU and the difficulties related to the disability caused by the disease. Farm work, fishing or housekeeping requires movement and physical effort. Furthermore, social relationship and participation require physical capability. In Benin context, there is almost no social assistance to help for long term BU patients in their needs and most of the BU programs function with external funds. These facts suggest that, if parents and friends do not come in help, whatever his/her physical disability, the subject will have to work. In these conditions described previously, the low mental health and vitality associated paradoxically to the high level of physical functioning and physical role suggested that, subjects are living permanently in anxiety and that their emotional response plays a key role in their physical performance. It also suggested that even if they are not satisfied with their quality of life, their physical disability does not affect their physical functioning and their participation. In other hand, the low mental health may result from their self-perception as subjects who lost their physical integrity due to the contracture, deformities and ankylosis which could have stigmatization for consequence. Further study is needed to clarify these allegations.

Literacy and occupations influence the quality of life [29]. However, this study shows an inverse reality since illiterate patients have a better QOL than literate patients. Likewise, farmer/fisherman and housewife show better physical and mental health than the civil servant, the teachers, the traders and the business men. These data suggest that the subjective aspect of the QOL keeps an important place in the personal evaluation of the physical and mental health in our study population. Indeed, the positive or negative judgment expressed by the subject on his/her QOL depends on his living and experience, the current and the future expectation as well as his environment and anticipation. The illiterate subjects inhabitant of the developing rural zone seem limited in their appraisal.

**Table 3. Relationships of the patients' socio-economic and clinical factors with their physical health status**

| Sex | PF | PR | BP | GH | PCS |
|---|---|---|---|---|---|
| | -0,038 | -0,009 | -0,017 | -0,065 | -0,045 |
| Age (at the study onset) | ,457** | ,390** | ,338** | ,207* | ,410** |
| Employment | -0,066 | -0,108 | -0,169 | -0,004 | -0,064 |
| Marital status | ,341** | ,302** | ,192* | 0,14 | ,287** |
| Age at the beginning of the disease | ,364** | ,313** | ,280** | ,198* | ,322** |
| Type of the lesion | 0,104 | 0,025 | 0,073 | 0,023 | 0,077 |
| Location of lesion | -,228* | -0,031 | -0,02 | -0,05 | -0,157 |
| Traditional treatment | -,280** | -,298** | -0,187 | -0,155 | -,286** |
| Surgical treatment | -,242* | -0,154 | -0,096 | -,219* | -,229* |
| Mobility preserved | ,339** | ,319** | ,368** | ,403** | ,387** |
| Physiotherapy | 0,023 | -0,01 | 0,176 | 0,014 | 0,023 |
| Muscle weakness/atrophy | -0,104 | -0,166 | -0,037 | -0,017 | -0,111 |

*Relationship obtained by Spearman's Rho test. The correlation coefficients range from too low to moderate; n = 105 patients. ** Correlation is significant at the 0.01 level (2-tailed); P< 0.05. * Correlation is significant at the 0.05 level (2-tailed); P< 0.05. PCS = Physical Component Score; PF = Physical Functioning; PR = Physical Role; BP = Body Pain; GH = General Health*

**Table 4. Relationships of the patients' socio-economic and clinical factors with their mental health status**

| Sex | VT | SF | ER | MH | MCS |
|---|---|---|---|---|---|
| | -,241* | -,284** | -,231* | -,288** | -,303** |
| Age (at the study onset) | 0,176 | -0,189 | -0,106 | -,215* | -0,105 |
| Employment | 0,021 | ,341** | ,207* | ,308** | ,251** |
| Marital status | 0,043 | -0,158 | -0,071 | -0,187 | -0,099 |
| Age at the beginning of the disease | 0,139 | -,290** | -0,176 | -,238* | -0,167 |
| Type of the lesion | 0,089 | 0,086 | 0,034 | 0,077 | 0,078 |
| Location of lesion | -0,014 | -0,128 | -0,069 | -0,021 | -0,058 |
| Traditional treatment | -0,169 | -0,178 | -0,187 | -0,104 | -0,184 |
| Surgical treatment | -0,005 | -0,152 | -0,115 | 0,009 | -0,075 |
| Mobility preserved | ,312** | ,268** | ,289** | ,284** | ,324** |
| Physiotherapy | 0,105 | -0,029 | -0,016 | 0,059 | 0,03 |
| Muscle weakness/atrophy | 0,064 | ,209* | ,210* | ,247* | ,207* |

*Relationship obtained by Spearman's Rho test. The correlation coefficients range from too low to moderate; n = 105 patients. ** Correlation is significant at the 0.01 level (2-tailed); P< 0.05. * Correlation is significant at the 0.05 level (2-tailed); P< 0.05. MCS = Mental Component Score; VT = Vitality; SF = Social Functioning; ER = Emotional Role; MH = Mental Health*

**Table 5. Factor pattern matrix for SF-36 and correlation of the specific activities with SF-36 subscales**

| | Factors pattern matrix | | Correlation (r) |
|---|---|---|---|
| | Factor 1: Physical health | Factor 2: Mental health | Specific activities |
| Eigenvalue | 4.95 | 1.19 | - |
| Explained variance (%) | 61.90 | 14.97 | - |
| Physical Functioning (PF) | .75* | .43 | .731** |
| Physical Role (PR) | .94* | .22 | .746** |
| Body Pain (BP) | .56* | .31 | .578** |
| General Health (GH) | .49 | .74* | .554** |
| Vitality (VT) | .30 | .87* | .548** |
| Social Functioning (SF) | .24 | .71* | .339** |
| Emotional Role (ER) | .94* | .19 | .444** |
| Mental Health (MH) | .17 | .92* | .271** |

*\* Factor loading >0.50 are considered significant, \*\* Correlation is significant at the 0.01 level; P< 0.0001*

The study also showed difference in physical and mental health status between men and women. These results were consistent with observations reported in leprosy patients and other illness status [25,30]. Furthermore, the age of the patient and his matrimonial status, have effect on the HRQOL level. Although, taking care of the family, the farm work, the taking part to the life of the community as well as being realized are the main aim of the people living in the southern Benin, many housework such as going to well, splitting wood, cooking and as well as taking care of the children are often left to women. The results of our researches suggested that, these responsibilities guide their decisions to pursue the struggle for the better since subjects married, divorced or widowed had showed a level of physical health and participation relatively higher than other groups of subjects. But the latter are more preoccupied with the future.

Some factors are positively or negatively associated with the physical health of the adults healed from BU. Factors such as age and preserved mobility at the state of the recovery are positively linked to the physical health. In other words, patient with limit mobility or patient with low physical activities, shows low HRQOL [31]. A great number of patients with weak level of mobility are those who undergo surgical treatment, which was consistent with the negative correlation of surgical treatment with the PCS. Other reasons can explain the negative correlation of surgical treatment and physical health. Firstly, surgical treatment is indicated for lesions category III (diameter >15 cm) which often have important tissues damaged [6] and thus are more susceptible to provoke ankylosis, muscle contracture, atrophy, and disability. Hospitalization's duration is also another factor.

The mean duration observed is around 1 to 6 months [1]. In these conditions, the surgical treatment is followed by a skin grafting and a long period of immobilization. Both surgical treatment and long period of immobilization can provoke important sequels and consequently, cause low physical health. A further study is needed to specify the type and the frequency of the disability that follow the surgical treatment in BU care.

## 5. CONCLUSION

To round up, BU patients healed in a long term, physically and psychologically marked by the sequels induced by the disease. Although, these sequels decrease the QOL of all these patients, the present study showed that, subjects aged, married, divorced or widowed, have better QOL than the other social groups even if they have the weaker mental health. The study also revealed that several factors are positively or negatively associated with the levels of physical and mental health observed in these patients. Finally, this study suggests that interventions and supports are needed to improve physical and mental health of the patients healed from BU disease. We hope that, the findings of this study will fill in the lack of information in this domain and served as basis to a specific approach to the treatment which will integrate more specific parameters of the well-being and the satisfaction of the patients.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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