CHAPTER 1

GENERAL INTRODUCTION
HEALTH PSYCHOLOGY RESEARCH IN SUB-SAHARAN AFRICA

Research in the field of health psychology is concerned with psychological processes in health, illness and health care. Three important issues within this field, all of which are important when studying communicable diseases in Sub-Saharan Africa, will be addressed in this thesis.

The first issue (chapter 2 and 3) is about the role of symptom perception and interpretation, and how this can influence patients’ help seeking behavior. When confronted with symptoms of a disease, patients do not always seek immediate help, and they do not always seek help at the most appropriate facility. Instead, it is known that many patients delay a considerable amount of time in seeking help, a problem which is especially relevant in countries in Sub-Saharan Africa. Factors involved in seeking help will be approached using a health psychological theoretical model. Delay in seeking help will be examined in healthy individuals at risk for the mycobacterial infection Buruli ulcer from Benin, and in patients diagnosed with tuberculosis from Nigeria.

The second issue (chapter 4 and 5) concerns factors that play a role during patients’ hospitalization for Buruli ulcer (BU). Patients who are being hospitalized for BU, are often admitted for a long period of time, during which they have to undergo different medical procedures. Wound care is likely to elicit pain and fear in patients, which will be addressed from two perspectives, namely, from a patient perspective, and from a health professionals’ perspective.

The third issue (chapter 6 and 7) addresses one of the reasons for the neglect of psychological factors and mental health factors, in research in low- and middle-income countries, namely the impreciseness of measures of mental health conditions [1]. The measurement properties of two important and well-known psychological measurement instruments, namely the Center for Epidemiologic Studies Depression scale, measuring depressive symptoms, and the Pearlin mastery scale, measuring personal control, will be examined. Both these instruments are important for measuring outcomes in patient care.
Part 1: Delay in seeking help for Buruli ulcer and tuberculosis

Buruli ulcer

Buruli ulcer (BU) is a cutaneous infection, caused by the environmental pathogen Mycobacterium ulcerans. BU is probably the third most common mycobacterial infection after Mycobacterium leprae and Mycobacterium tuberculosis [2]. Cases have been reported from at least 32 countries worldwide; from Africa, North and South America, South-East Asia, and the Western Pacific. The main burden of disease is found in Sub-Saharan Africa, where approximately 24% of all cases worldwide are found. Especially in Cote d’Ivoire, Ghana and Benin, high prevalence rates have been reported [3]. The World Health Organization (WHO) listed Buruli ulcer as one of the 17 neglected tropical diseases. The WHO supports by improving prevention, diagnosis, treatment and care for individuals affected by, and at risk for these diseases [4].

BU is acquired from the environment, by as yet incompletely understood mechanisms. The pathogenic organism - an environmental bacterium - inoculates skin and subcutaneous soft tissues through skin trauma. The main risk factor for acquiring BU in Sub-Saharan Africa is living in an endemic area. Within an endemic area, living near stagnant water, the failure to wear protective clothing, and a lack of appropriate care of skin wounds are risk factors for being affected with BU [5-8]. Human to human transmission is rare, and the role of aquatic insects and mosquito’s is under investigation [9]. In Africa, Buruli ulcer affects men as well as women in all age ranges, but impacts mainly on children below 15 years of age [8,10]. This is, however, more likely to be due to the age distribution in the population, than to age-specific characteristics of the disease.

The disease has been described extensively [11]. The pathology is characterized initially by necrosis of subcutaneous fat with an ulceration of the overlying skin, and lymphedema, and strikingly little inflammatory response. Later, a granulomatous response in the skin and subcutaneous tissues occurs [12,13]. The main virulence factor of the causative organism M. ulcerans, is a secreted lipid toxin called mycolactone [14,15]. The presence of mycolactone in tissue causes the extensive necrosis, but also the lack of inflammatory response in initial lesions [16-18]. Standard treatment consists of eight weeks of oral rifampicin and intramuscular streptomycin, which has shown to be effective in early, limited size
ulcers [19], while larger lesions of Buruli ulcer sometimes require additional surgery. The development of an effective vaccine is currently being investigated [20,21].

Even with appropriate treatment, ulcers may last several months or even years before they finally heal, and patients often end up with scarring, calcification, muscle weakness, contractures and functional limitations after their wounds have healed [22,23]. Although the mortality rate from BU is low, the impact of the disease in terms of socio-economic consequences for patients and their family in rural areas in Sub-Saharan Africa is high [24,25]. Patients often feel stigmatized [26], experience financial consequences [27], social isolation, school drop-out or loss of employment [28].

**Tuberculosis**

Tuberculosis (TB) is the second mycobacterial infection worldwide, caused by Mycobacterium tuberculosis, affecting 8.6 million individuals in 2012, resulting in 1.3 million deaths [29]. The mycobacteria attacks most often the lungs, and is spread through the air by infected patients. Most frequently experienced symptoms of pulmonary TB are cough with - sometimes bloody - sputum, fever, night sweats and weight loss [30]. Nigeria is one of the by the WHO defined high burden countries with a prevalence rate of 270.000 cases in 2012. Diagnosis in Nigeria is clinical case detection followed by sputum smear microscopy. Treatment for TB is recommended by the WHO as the Directly Observed Treatment Short-course (DOTS) strategy. Early case detection and treatment is highly important in order to control the disease. Treatment is most successful when appropriate care is provided shortly after experiencing symptoms [31]. Delayed treatment affects the prognosis of the affected individual, as well as the transmission within the community.

**Delay in seeking help**

Delay in seeking treatment at an appropriate health facility after noticing symptoms, described in the literature as *patient delay*, is a common and serious problem in Buruli ulcer [32], as well as tuberculosis [40]. It is one of the main challenges for national programs fighting these diseases. The exact proportion of patient delay in Buruli ulcer is difficult to estimate, since a proportion of patients never show up at the recommend health facility. In a study among former BU
patients in Benin, the median delay period was 34 days [33]. Patient delay in tuberculosis was estimated to be more than four weeks among 80% of Nigerian patients [34].

In order to define patient delay, the model by Andersen et al. (2005) was used, splitting the total patient delay into appraisal delay, illness delay, behavioral delay, scheduling delay and treatment delay. It was decided to focus in this thesis upon the first three time periods of delay together, which we named pre-hospital delay. These three time periods are; appraisal delay, i.e. the time a person takes to evaluate a symptom as a sign of illness; illness delay, i.e. the time the person takes from the first sign of illness until deciding to seek professional medical care; and utilization delay, i.e. the time from the decision to seek care until the consult at a health facility. A month, or 30 days, is generally used as a cutoff value for this delay period in tuberculosis. In Buruli ulcer, a cutoff value to define delay has not been established yet, thus, for the current thesis, 20 days or more was used to indicate a significant delay.

There are multiple reasons for focusing on this specific delay period, both from literature on BU as well as TB. First, it was shown that in Nigeria, this type of delay was most frequently observed and considered to be the major contributor to the total delay in TB [35]. Second, literature describes multiple health seeking activities before the recommended treatment is sought, which is an important factor increasing delay both in BU and TB. Third, once a patient arrives at the health facility, both treatments are freely available and there is no waiting list preventing a direct onset of treatment. Therefore, delay in BU as well as TB, is defined in this thesis as the time between signs or symptoms are first noticed, and the point at which the patient takes concrete action by presenting to the health care center or hospital.

Individual differences explaining delay

Extensive research is conducted on factors related to patient delay in Africa, however, none of them primarily focused on psychological factors. This is remarkable, because it is known that individual differences exist in the time period of delay in BU and TB patients [33,35]. Instead, previous studies among BU and TB patients focused on factors related to the health system, stigma or cultural beliefs. For example, residing in rural areas, low socio-economic status, low
educational level, a lack of knowledge about the disease, poor access to health care, stigmatization, and beliefs about a supernatural cause of the disease were related to a prolonged patient delay [36-40]. BU patients specifically feared surgery and limb amputation [33,41], which was related to a prolonged hospital delay. In TB patients, the co-existence of a chronic cough or other lung disease was related to more delay [40].

One factor which has a strong relationship with patient delay in both TB and BU, is the choice of treatment. Instead of presenting at the recommended treatment facility, patients often start with self-treatment, combined with or followed by visits to multiple health care providers [34,42-47]. These include traditional treatment, but also nearby, lower-level health posts, which are often less equipped and specialized than the dedicated treatment centers. The choice for alternative treatment can lead to misdiagnosis and ineffective management. Reasons not to present to the recommended treatment center are found to be the poor access to the appropriate health facility and stigmatization. This has been found in TB [40] as well as BU [26,48].

It is known that patients’ individual perceptions about their disease can explain additional variability in delay [49]. Research supports the Common Sense Model (CSM) as a theoretical model for the relationship between illness perceptions and self-management outcomes such as delay [50]. An illness perception is a person’s subjective view of a specific illness, and has cognitive and emotional aspects. It is made up of five components the perceived identity, causes, course, consequences, and controllability of the disease which guide individuals in their coping behavior (delay or not) in order to achieve a goal (cure of the disease). For example, a patient with symptoms of Buruli ulcer or tuberculosis choosing alternative treatment, could have different ideas on the causes or consequences of his/her disease, compared to a patient choosing the recommended treatment. Such ideas could be that the disease is caused by a curse due to bad behavior in the patients’ past. In order to get rid of this curse, treatment at a traditional healer might be preferred. The relationship between illness perceptions and delay has never been examined in Buruli ulcer, and only once in TB patients from Russia[45], showing that illness identity was related to delay.

Thus, delay in seeking treatment is an important problem in BU and TB in Africa, for which individual differences exist. Previous studies mainly focused on socio-
economic factors, factors related to the health system, stigma or cultural beliefs, or used a qualitative approach or focus groups. This highlights the gap in knowledge on psychological factors related to delay in BU and TB. The Common Sense Model is a useful model to examine this relationship quantitatively, with standardized measures, which will be the objective of chapter 2 for Buruli ulcer, and of chapter 3 for TB.

Part 2: Pain in Buruli ulcer

Buruli ulcer patients undergo dressing changes weekly throughout their treatment period. Despite the fact that Buruli ulcer is described in the literature as painless, this repetitive procedure is observed to cause pain; perhaps not for all, but surely for some patients. In addition, fear is sometimes observed in these patients, in the waiting area outside the dressing room, in anticipation of what will happen.

Pain is defined as ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage’ [51]. Currently, no clinical studies have been published about pain in Buruli ulcer, and such information is badly needed [52,53]. The only clinical reports in the literature of pain in Buruli ulcer to date, are a case report of pain in a Japanese patient [54], and the notification by Nienhuis et al. (2010), that patients sometimes reported an increase in pain at the lesion site just before and at the time the lesion ulcerated [19].

In contrast to the clinical observations, Buruli ulcer has been described as a relatively pain free condition, despite its presentation with extensive ulcers [12]. This lack of pain is caused by the mycobacterium M. ulcerans, producing mycolactone, affecting the skin and peripheral nerves. This causes skin necrosis and aptosis; a process of cell degradation which ultimately leads to cell recycling. Mycolactone is also suggested to be responsible for the muscle weakness and contractures often seen in BU patients [55].

Professionals involved in BU treatment in Ghana and Benin stressed the need to improve pain treatment [56]. There is currently no standardized treatment for pain in Buruli ulcer. A clinical practice guideline is generally a useful tool to standardize pain treatment, because it describes appropriate care with a scientific basis and a broad consensus, and it has shown to decrease patients' pain in other medical conditions [57]. In order to examine whether there is a desire to
implement a guideline for pain treatment in BU, there is a need for more knowledge on several treatment aspects. First of all, information on the current practice with respect to pain treatment is needed, including the use and availability of pain medication, and professionals’ knowledge and use of the WHO ‘pain ladder’. Furthermore, it should be explored whether there is a desire from professionals to develop a clinical practice guideline. Eventually, based upon the results of studies on the current pain treatment, factors that might be of influence to a future guideline implementation could be explored.

Thus, since here is currently a gap in the knowledge on the pain experience of BU patients during treatment from empirical, clinical studies, this will be examined from two perspectives. Firstly, we will examine pain during treatment quantitatively in BU patients, using a repeated measures design with self-report pain scales which are appropriate for the population under study. This will be the purpose of chapter 4. Secondly, we will examine pain treatment by semi-structured interviews performed with a variety of health professionals involved in BU treatment in Ghana and Benin in chapter 5.

Part 3: the Psychometric evaluation of clinical scales in Sub-Saharan Africa

‘The investigator who would study pain is at the mercy of the patient, upon whose ability and willingness to communicate he is dependent’ [51].

Internal states such as pain can only be assessed indirectly; by what people tell us verbally, by behavior, or by psychological correlates. This requires a measurement instrument which is meaningful and consistent in the context in which it is used. A good-quality measurement instrument is related to valid and reliable outcomes and meaningful relationships, while a poor quality instrument complicates the interpretation of results and comparison of results between groups, between or within individuals at different time points. This issue was one of the objectives of chapter 4, namely to examine the psychometric properties of a self-report pain scale (Wong Baker Pain Faces scale revised).

Related to that, measuring pain in a way similar to measuring mental concepts, such as perceptions or depression. Psychological concepts are characterized by their latent nature, meaning that they are not observable in daily life and subjective, hampering an accurate measurement, in comparison with objective, observable measures such as length or temperature. It becomes more
complicated when the assessment is performed in ‘new’ study populations, such as individuals from rural areas in Sub-Saharan Africa. It could be that cultural factors influence the outcome of measurement.

Conducting psychological research among African study populations, by using instruments that were developed in Western, Educated, Industrialized, Rich, Democratic (WEIRD) populations [58], can only result in high quality outcomes, once quality of the measurement is established. Therefore, proper translation and adaptation is crucial. This process is called cultural equivalence testing [59]. The framework by Herdman et al. (1998) provides a useful guideline, including five aspects to be examined to achieve equivalence of a measurement instrument. These aspects are the conceptual (are concepts similar?), item (do items estimate the latent trait similarly?), semantic (is translation accurate?), operational (mode of administration) and measurement equivalence (psychometric properties), respectively [59].

In this thesis, we will focus upon two parts of the cultural equivalence testing model of Herdman, namely the item equivalence - or item functioning -, and measurement equivalence. This will be examined for two psychological measurement instruments. These are the Center for Epidemiologic Studies Depression scale (CES-D), which was developed to measure depressive symptoms in the general population, and the Pearlin mastery scale, which assesses a sense of personal control.

The CES-D was selected because currently, a valid instrument to screen and assess depression in Sub-Saharan African countries is lacking and urgently needed, given the large proportion of the burden of depression in these countries and the low access to mental health services and good quality treatment [60]. Furthermore, screening instruments for depressive symptoms are currently being used in these populations, without validation of the instrument [61-66], which might lead to inaccurate prevalence rates.

The Pearlin mastery scale was selected because it is one of the most widely used instruments to measure personal control, which is an important psychological resource related to better psychological and physical health outcomes. There is currently no information about the validity of a measurement instrument of personal control in Sub-Saharan African countries, which is warranted because
previous studies indicated that while the concept seems to be universally existent, measurement of the construct might be influenced by cultural factors [67-69].

For both scales, the approach is similar. First, we will examine the scale’s item and scale functioning, by using Item Response theory. This is a recommended analysis method, providing detailed information about how useful each of the items of the two scales is in our study population [70]. Information about whether the items were informative in measuring the latent construct will be generated. Second, we will compare the results in the Sub-Saharan African group to the results in a large Dutch control group in order to gain insight into the equivalence of item and scale functioning of both scales. The outcomes of this analyses are presented in chapter 6 for the CES-D, and in chapter 7 for the Pearlin Mastery Scale.
References


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