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The Quality of Life Among Lymphedema Patients Due to Lymphatic Filariasis in Three Rural Towns in Haiti

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by

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Lists of Abbreviations

ADL	Acute Adenolymphangitis
BCG	Bacillus of Calmette and Guerin
CDC	Center for Disease Control and Prevention
CES-D	Center for Epidemiologic Studies Depression Scale
DEC	Diethylcarbamazine
DLQI	Dermatology Life Quality Index
DTP3	Diphtheria, Tetanus Toxoids, and Pertussis Vaccine
EQ-5D	EuroQol Five-dimension Health Scale
EQ-VAS	EuroQol Visual Analogue Scale
EuroQol	EuroQol Health Questionnaire
GDP	Gross Domestic Product
GPELF	Global Programme to Eliminate Lymphatic Filariasis
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immuno-Deficiency Syndrome
ICC	Intraclass Correlation Coefficient
LF	Lymphatic Filariasis
MPCE	Ministere de la Planification et de la Cooperation Externe
NHP	Nottingham Health Profile
PAHO	Pan American Health Organization
QOL	Quality of Life
SES	Socioeconomic Status

SF-36	MOS 36-item Short-form Health Survey
STDs	Sexually Transmitted Diseases
WHO	World Health Organization

The Quality of Life Among Lymphedema Patients

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ABSTRACT

The worldwide eradication of lymphatic filariasis has recently started with two strategies, interruption of transmission and morbidity control. One of the most endemic countries, Haiti has experienced successful interventions through national and international efforts, but the morbidity control is still hindered by a lack of adequate information on quality of life (QOL) issues among those suffering from the chronic manifestations of the disease such as lymphedema. In addition, previous interventions have been focused primarily in a single community where an established lymphedema treatment clinic serves as a national reference center, so it is critical to expand programs to other areas in Haiti.

The purpose of the study was to understand the issues of morbidity control and QOL among lymphedema patients due to lymphatic filariasis in three rural Haitian towns. Secondary data (n = 316) collected in an ongoing filariasis support group project was analyzed in terms of socio-demographic characteristics, including gender age, and regional perspectives. Also, two different commercial QOL instruments (EuroQol, CDC Healthy Days) and a subjective well-being assessment tool (CES-D) were introduced to describe their QOL and mental health status, respectively. The reliability and validity of

the measurements were established at the same time.

Regional differences were evident in patients' illness history, knowledge of the illness, self-care and self-efficacy for legs, and major QOL indicators related to physical and mental health. Age of patients also influenced foot size, illness stage, and the QOL scores. However, other socio-demographic factors were poorly associated with filariasis-related variables, including gender. The commercial QOL instruments and a standardized mental health tool satisfied a reasonable level of reliability and validity. Though additional discussion is needed regarding the validation of the mental health scales between EuroQol and the other instruments, they nevertheless offer utility for enhancing the quality of morbidity control programs.

These findings offer a significant contribution for the development of filariasis prevention programs such as community-based morbidity control and support group activities in Haiti, as well as other areas of the filariasis-endemic world.

330 words

Chapter One

Introduction

Lymphatic filariasis (LF) is among the most common vector-borne diseases in tropical regions. Above a billion people are at risk and over 120 million people are infected with parasites in more than 80 countries in Africa, Asia, Central and South Americas, and the Pacific Islands (World Health Organization [WHO], 2000a). Of those, 44 million people are suffering from symptomatic conditions such as lymphedema and hydrocele.

Lymphatic filariasis is one of six eradicable tropical diseases worldwide (Center for Disease Control and Prevention [CDC], 1993). In 1998, WHO started the Global Programme to Eliminate Lymphatic Filariasis (GPEFL), an initiative aimed at complete eradication of filariasis by 2020. The program is based on two strategies: interruption of transmission and morbidity control. The interruption of transmission is designed for at-risk and asymptomatic populations, and fairly achievable by several substrategies such as mass drug distribution and diethylcarbamazine (DEC)-fortified salt intake in endemic areas. The other approach, morbidity control, is targeted for those who live with chronic manifestations due to lymphatic filariasis. The control strategy includes adequate health education, compliance with hygiene regimens, and related efforts. However, it is still hindered by a lack of adequate information on quality of life (QOL) issues, which could lead to more suitable, effective guidelines for morbidity control. Particularly, since

filariasis is greatly associated with different socio-demographic variables (King & Freedman, 2000) and its clinical conditions are diverse by region or even within the same community (Dreyer, Figueredo-Silva, Neafie, & Addiss, 1998), providing appropriate morbidity control programs is a challenge in endemic areas including Haiti, which has one of the highest prevalence rates worldwide.

One of the most common symptomatic manifestations due to LF is lymphedema. The non-fatal body disfigurement causes a huge burden of disability among infected people over decades. Currently about 15 million people are living with lymphedema worldwide. In one filariasis endemic area of Haiti, it is estimated that more than 20% of the population are carriers of microfilaremia (Pan American Health Organization [PAHO], 2001), and approximately 5% of women suffer from a severe form of lymphedema called elephantiasis (Eberhard, Walker, Addiss, & Lammie, 1996). Lymphedema is also often associated with the comorbidity of hydrocele and/or acute attacks. Such conditions execerbate daily life, but little research has been conducted on QOL among lymphedema patients. In Haiti, a morbidity control program has been in operation for almost a decade, at Ste. Croix Hospital in Leogane, and new treatment programs have recently been initiated in a few other areas of high endemicity. Therefore, understanding the issues of disabilities and the QOL among lymphedema patients due to LF would provide timely insights for improving morbidity control in other filariasis endemic areas in Haiti.

There are several objectives in this study. The first objective is to observe the association of filariasis-related variables among filariasis-related lymphedema in three rural Haitian towns. The association between the disease and socio-demographic

indicators is complicated because it is known that the prevalence and characteristics of filariasis varies by region or even within the same community (Dreyer et al., 1998) and that different populations infected with the same parasite can have very different clinical manifestations of the infection (Ottesen, 1987). Also, gender poses an important but complicated issue in LF and that there are no consistent results from an epidemiological standpoint. Above all, since it has been reported that there is higher prevalence of LF among women in Haiti (Lammie, Addiss, Leonard, Hightower, & Eberhard, 1993), attention to male Haitian patients has been very limited. Thus, careful consideration of socio-demographic variables would be significant for understanding of regional filariasis problems and the development of future morbidity control plans in the new communities.

The other objective is to introduce and evaluate QOL measures among lymphedema patients due to LF. The QOL assessment procedure is now well established in chronic diseases. Though LF is categorized as an infectious disease, the symptomatic manifestations are chronic. Particularly, lymphedema due to LF is considered one of the most severe chronic disabilities among infectious diseases. Therefore, the application of the common generic QOL instruments such as the CDC Healthy Days Scales and EuroQol Instrument (EuroQol) would be an innovative approach to assess the QOL among the filariasis-related lymphedema patients. Also, a subjective well-being assessment tool for mental health, Center for Epidemiologic Studies Depression Scale (CES-D) would provide supplemental information for morbidity control. In order to fit these tools into Haitian cultures, it is important to establish the reliability and validity of the measurements prior to the assessment. Since there is no gold standard for QOL assessment for LF, the findings would be a significant contribution to future guidelines

for QOL assessment of LF as well as provide background information for the morbidity control programs.

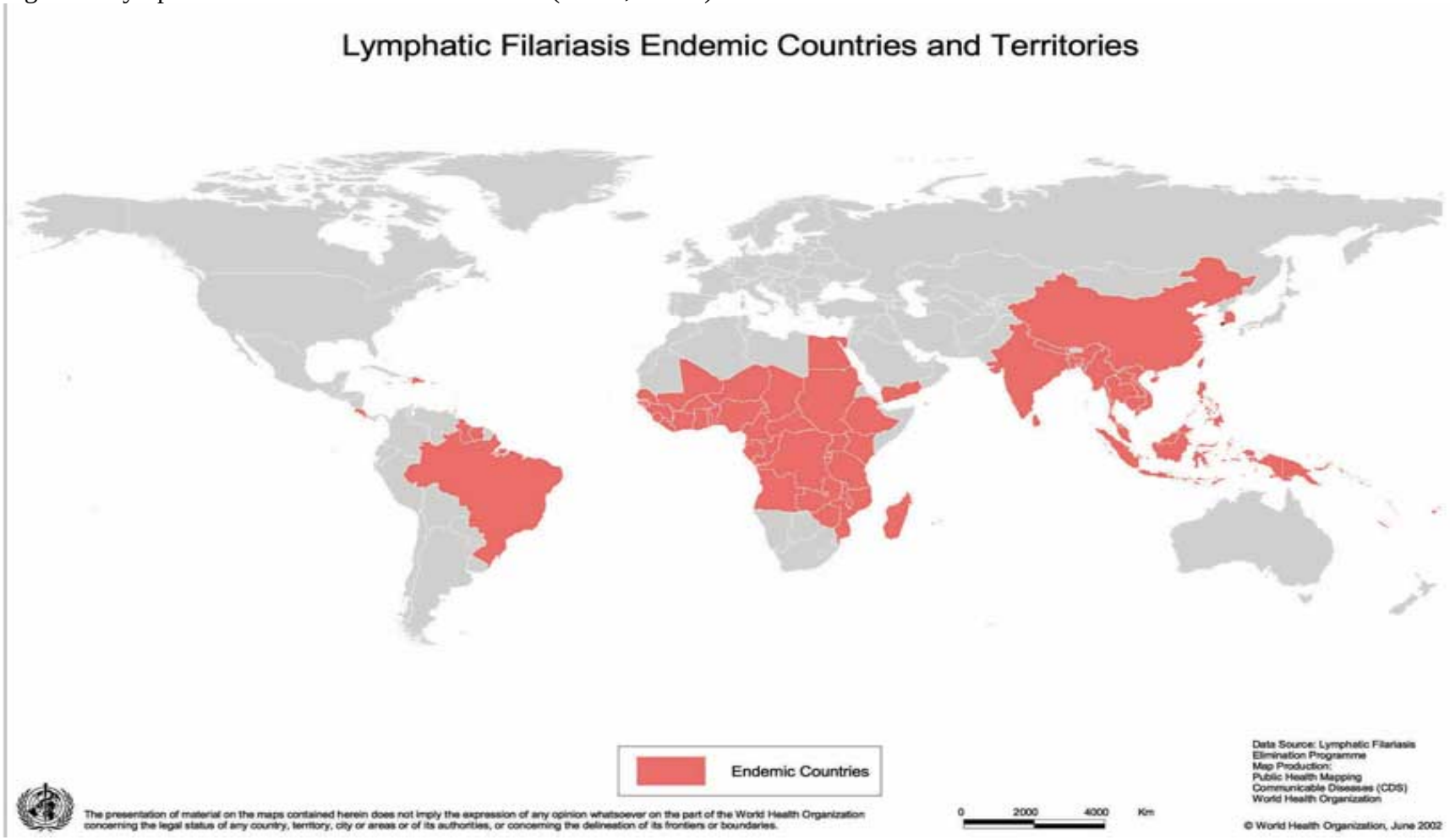
Chapter Two

Review of Literatures

General Background - Epidemiology, Etiology, Treatment, and Prevention

Lymphatic filariasis is one of the most common vector-borne diseases in tropical regions. More than a billion people are at risk and over 120 million people are infected in more than 80 countries in Africa, Asia, Central and South Americas, and the Pacific Islands, (WHO, 2000a; WHO, 2002a). In particular, more than 40% of infected people live in India, and one-third in Africa. Filariasis is caused by eight different parasitic nematode worms: *Brugia malayi, Brugia timori, Mansonella ozzardi, Mansonella perstan, Mansonella streptocerca, Loa loa, Onchocera volvulus,* and *Wuchereria bancrofti* (King & Freedman, 2000). Of those, *W. bancrofti*, *B. malayi*, and *B. timori* are responsible for the infection in the lymphatic system of humans. *W. bancrofti* accounts for 90% of all infections of LF. It occurs in most tropical and subtropical filariasis endemic regions. On the other hand, the prevalence of brugian filariasis is limited to Asia. *B. malayi* is found from India in the west to South Korea in the northeast and Indonesia in the southeast (King & Freedman, 2000). *B. timori* is located only in eastern Indonesia. Brugian filariasis accounts for 13 million among all filarial-infected people. Figure 1 shows endemic countries of LF worldwide.

Figure 1. Lymphatic Filariasis Endemic Countries (WHO, 2002a)



The disease is transmitted by several kinds of mosquitoes. *W. bancrofti* is transmitted by *Culex quinquefasciatus, Anopheles,* and *Adeles*. *Anopheles* is also responsible for *B. malayi* transmission as well as *Coquilletidia* and *Mansonia*. *B. timori* is transmitted by *Anopheles barbirostris* (King & Freedman, 2000).

The life cycle of the filarial parasite is identical to other vector-borne diseases. When the female mosquitoes ingest microfilariae with blood from infected humans, the microfilariae develop into infective filariworm larvae in the thoratic muscles of the mosquitoes, and travel to the lymphatics through the bloodstream. Then the larvae enter the human body when the mosquitoes feed on blood. In the lymphatic system, the larvae develop into adult worms and the female worms yield microfilariae, which reach the bloodstream again after the 6 – 12 months incubation period.

Infected persons show one or more conditions after the incubation period. The conditions are divided into three stages: aymptomatic damage to the lymphatic system and kidneys, acute attacks of filarial fever, and chronic conditions such as elephantiasis and hydrocele. Asymptomatic infection is identified by the observation of millions of microfilariae in the blood vessel or adult worms in the lymphatic system without the onset of symptoms. The damage to the lymphatic system may enhance a risk of acute attacks such as acute adenolymphangitis (ADL). Kidney damage may cause blood and protein loss in the urine. Clinically asymptomatic microfilaremia is the most common manifestation of bancroftian filariasis, but a large proportion of infected people do not show any symptomatic sign (King & Freedman, 2000). It is estimated that 120 million people have asymptomatic conditions worldwide (WHO, 2000b).

An acute episode is characterized by severe pain and inflammation of skin, lymph

nodes, and lymphatic vessels, often accompanied by fever, nausea, and vomiting. It is triggered by bacterial infections, which enter through breaks in the skin. ADL appears not only during the asymptomatic stage but also during the onset of chronic conditions. The attack usually lasts 5 - 7 days and usually occurs several times each year. Though some people have only a few attacks in their lifetime, they are likely to have experienced asymptomatic or subclinical conditions for years prior to the acute attack (King & Freedman, 2000). The progression of elephantiasis and fibrosis is typically observed during the attack. In the world, 15 million people are currently suffering from acute attacks (WHO, 2000b).

Because the disease is rarely fatal, chronic symptoms are the severe burdens of infected people. The major symptoms include adenopathy, genital manifestations, lymphedema, and tropical pulmonary eosinophilia. Adenopathy is a painless enlargement of a lymph node due to the presence of adult worms in the lymphatic vessel, but lymph node enlargement may be the only clinical symptom in infected people, regardless of the presense of microfilaremia (Dreyer et al., 1998). Genital manifestations include hematuria, hydrocele, chylocele, chyluria, lymphedema and elephantiasis of the scrotal wall, penis, and lymph scrotum. In particular, hydrocele is the most common genital impairment among males. Hydrocele is a symptom that the sac around the testes becomes inflated like a baloon with a volume of fluid inside. It is estimated that 25 million men suffer from hydrocele worldwide (WHO, 2000b). Chylocele also shows the same disfigurement of genitalia, but intestinal chyle are included inside of the sac. It is less frequent than hydrocele. Chyluria and hematuria may happen among infected people. In some cases, chyle and blood are present in the urine. Lymphedema is a lymphatic

dysfunction which dilates the lymphatic vessels due to filarial infections. It appears most frequently on the lower extremities of the legs, and the severe condition called elephantiasis includes dermatosclerosis and papillomatous lesions as well as the swelling of a part of or an entire body. Currently 15 million people worldwide are impaired by lymphedema/elephantiasis (WHO, 2000b). Tropical pulmonary eosinophilia is an asthma-like symptom with paroxymal nocturnal cough and anorexia, but its frequency is relatively unusual (Dreyer et al., 1998).

The strategy of the treatment and prevention of LF is well established. WHO (2000a) recommends annual, single-dose, two-drug regimens of diethylcarbamazine (DEC) with albendazole or ivermectin to get rid of microfilariae from the blood. For the infected surface areas, maintaining rigorous simple hygiene by careful cleansing is extremely helpful in managing the chronic condition and preventing acute attacks. Also, protecting the surface from mosquito bites by the use of bednets, insecticides, and repellents is effective for interruption of larvae transmission. Likewise, the control of mosquito-favorable environments such as large areas of water is also helpful. Surgical operation is another option for treatment of chronic conditions. However, though it is technically feasible and great improvement of the conditions can be expected, most endemic areas usually face financial limitations and inadequate medical resouces so that the operation is often not practical. DEC-fortified salt intake is also useful and cost-effective for future prevention.

Lymphatic filariasis is also called one of six eradicable diseases in the world (CDC, 1993). WHO has recently initiated the Global Programme to Eliminate Lymphatic Filariasis (GPEFL) to achive complete eradication of filariasis by 2020. The strategy of

the global elimination program includes two cost-effective and socially-responsible components: interruption of transmission, and morbidity control. The interruption of transmission is fairly achievable because humans are the only reservoir of *W. Bancrofti*, which is responsible for 90% of all parasites causing LF (Ottesen, 2000). Also, the transmission of the filarial worm is less frequent than with other parasite diseases (Ottesen, 2000). Thus, WHO designed the strategic procedures to interrupt transmission in two steps; districts in which lymphatic filariasis is endemic must be identified, and then community-wide (mass treatment) programs implemented to treat the entire at-risk population (WHO, 2000a). In most countries, one time annual simultaneous single dose administration of two drugs, 400 mg albendazole plus 6 mg/kg DEC, will be effective. The areas where either onchocerciasis or loiasis may also be endemic require the same regimen but use 200 mcg/kg ivermectin instead of DEC for 4-6 years. An alternative community-wide regimen is to provide common table/cooking salt fortified with DEC in the endemic region for a period of one year (WHO, 2000a). This mass treatment gives equal effectiveness to at risk populations.

On the other hand, morbidity control is targeted for those suffering from chronic conditions. Since the non-fatal disease often causes both suffering and disability among patients for a long time, it is necessary to alleviate their conditions. There are several approaches to morbidity control, but WHO (2000a) states that it will be necessary to implement community education programs to raise awareness in affected patients. This would promote the benefits of intensive local hygiene and the possible improvement, both in the damage already occurred, and in preventing painful, acute episodes of inflammation and future infection (WHO, 2000a). Also, the creation of hope and

understanding among the patients and their communities are additional important factors for morbidity control.

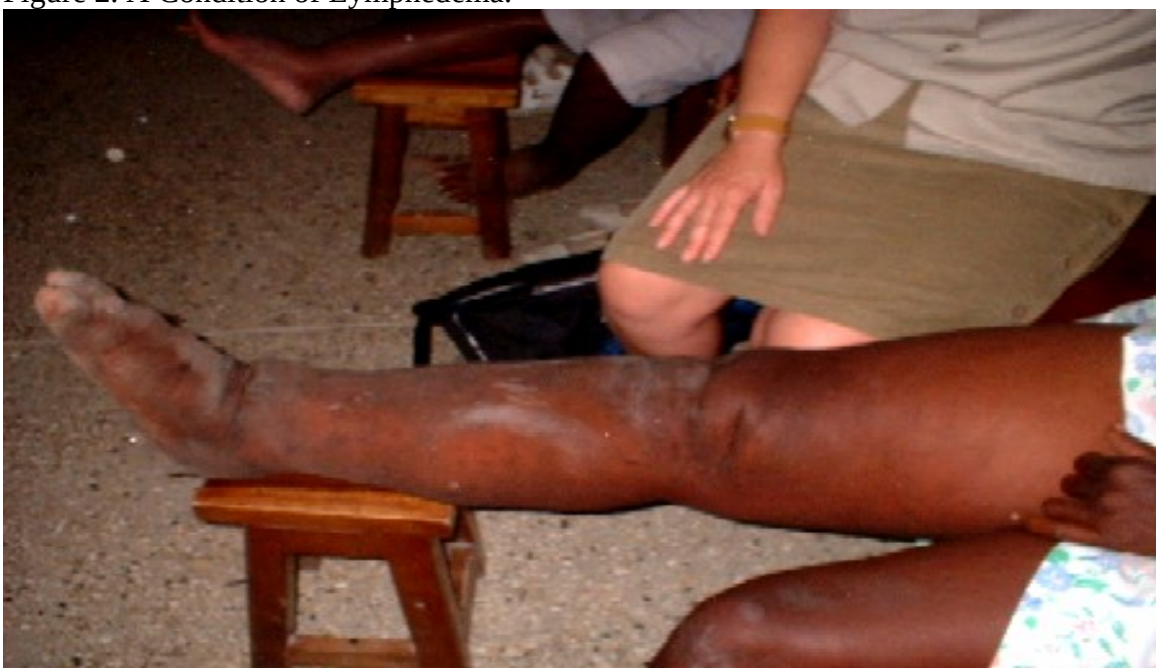
Lymphedema

Lymphedema is one of the commom chronic symptoms among LF patients (Figure 2). It is currenly estimated that 15 million people are living with lymphedema due to lymphatic filariasis worldwide (WHO, 2000b). The disease is caused by the presence of adult worms in the lymphatic vessels. It is sometimes triggered by physical events such as injury or pregnancy. The worms dilate the lymphatic vessels and make the lymphatic system malfunction. Lymphedema usually occurs in the lower extremities, but it also appears in the arms, breast, and urogenital organs. In the presence of the symptom on lower legs, Dreyer, Addiss, Dreyer, and Noroes (2002) categorized its symptom into seven stages (Table 1, Appendix A). Most conditions are either of stage 1, 2, or 3, but sometimes more extreme cases can be detected.

Table 1. Lymphedema Stage and Its Characteristics (Dreyer et al., 2002).

Lymphedema Stage	Characteristic
Stage 1	Swelling goes away overnight.
Stage 2	Swelling does not go away overnight.
Stage 3	Shallow skin folds.
Stage 4	Knobs.
Stage 5	Deep skins folds.
Stage 6	Mossy lesions.
Stage 7	Unable to care for self or perform daily activities.

Figure 2. A Condition of Lymphedema.



Like other filariasis symptoms, the prevalence of lymphedema increases as infected people get older. Shriram, Murheker, Ramaiah, and Sehgel (2002) found that the increase was stable between 20 and 30 years of age, but that it became significant afterwards. The prevalence of the disease is also associated with gender. However, the effects are not consistent. Lammie et al. (1993) found that the incidence of lymphedema was 5 – 10 times greater among females than males in Haiti. On the other hand, in India, more males experienced lymphedema than females (Shriram et al., 2002). Acute attacks frequently occurred among lymphedema patients. In Tanzania, 61.3% of lymphedema patients developed ADL (Gasarasi, Premji, Mujinja, & Mpembeni, 2000). Also, ADL was more common among patients with lymphedema than hydrocele in Ghana (Gyapong, Gyapong, & Adjei, 1996b). In addition, recurrent bacterial infections facilitated the progression of lymphedema to elephantiasis (Dreyer et al., 1998). Comorbidity of

lymphedema and other chronic symptoms, especially hydrocele in male, is another concern. In eastern India, Shriram et al. (2002) reported that 15.9 % of hydrocele patients had lymphedema, and 90 out of 565 (12.4 %) of male filariasis patients had both hydrocele and lymphedema in the southern state of Tamil Nadu (Ramaiah et al., 2000).

Regular, intensive hygiene is a critical part of the prevention and treatment of lymphedema. Though drug therapy such as albendazole and DEC is effective as an anti-parasitic treatment, daily washing and drying is extremely important for minimizing the chance of future acute attacks and maximizing the degree of elephantiasis improvement. Elevation of the legs is also an important exercise for alleviating the condition. In addition, patient education is critical for changing fatalistic beliefs about the disease and maintaining their motivation to follow the regimen (WHO, 2000a). Surgical procedures are limited in resource poor, filarial endemic settings.

Four Aspects of Lymphatic Filariasis

As mentioned above, morbidity control is one of two pillars of eliminating LF globally. WHO (2000b) categorized suffering and disability of LF into four different aspects: physical, social, psychological, and economic.

Physical components of disability include asymptomatic or symptomatic body conditions such as acute inflammatory attacks, disfigurement of the body, decreased mobility and function of limbs, obesity, and hidden disease (WHO, 2000b). The acute attack is a painful bacterial infection of the skin and superficial tissues. The incidence increases as they get older, with a peak in the 50s (Gasarasi et al., 2000; Gyapong et al.,

1996b). The impairment of the body influences daily activities, especially among female patients. Ramaiah, Vijay Kumer, Ramu, Pani, and Das (1997) found that women suffering from chronic conditions had significant difficulties in domestic chores. Also, there is a tendency for women to refrain from traveling due to the physical impairment (Bandyopodhyay, 1996; Coreil, Mayard, Louis-Charles, & Addiss, 1998; Ramaiah et al., 1997).

In addition to the physical burdens, there are huge negative impacts on social, psychological, and economic conditions among chronic patients. From a social perspective, malfunction of the body increases the difficulty of self-care. Although it is unusual to have a self-untreatable condition, the limitation of the body function enhances the stress of care in daily lives. Patients also suffer from shame, stigma, and discrimination due to disfigurement of the body. In Haiti, patients reported negative effects of their illness on family relations, and they experienced at least some sort of discrimination in the community (Coreil et al., 1998). Also, women experienced embarrassment, shame, cultural constraints, and social taboos preventing them from seeking help (Bandyopodhyay, 1996). People from the community often refuse to marry, sit beside, or eat with LF affected persons (Rauyajin, Kamthornwachara, & Yablo, 1995). Those suffering from genital impairment experience sexual disability. Above all, those with hydrocele experience severely impaired sexual function as well as decreased work capacity, and it has apparently negative effects on the QOL for the patients, families, and communities (Ahorlu, Dunyo, Asamoah, & Simonsen, 2001). Also, unmarried men with hydrocele found it difficult to find a spouse due to the condition, and married men experienced various degree of sexual dysfunction (Gyapong, Gyapong, Weiss, & Tanner,

2000).

Related to the social aspects, psychological burdens also influence patients' lives. It is significant to observe the negative consequence in mental health. Typically, people suffer from depression, passivity, hopelessness, and fatalism, in some cases even leading to suicide (WHO, 2000b). Such phenomena might happen among both patients and family members. However, low-cost psychosocial interventions such as support groups, offer significant benefits and satisfaction in allevieting the psychological burden of disease as well as improvement in QOL for people with LF in developing countries (Coreil, Mayard, & Addiss, 2003).

Finally, economic limitation is the other negative aspect of LF. Because of the nature of the disease, it significantly affects poor people. The impairment minimizes both quantity and quality of work among infected people. A large number of acute patients are completely absent from their jobs during the onset of attacks, usually 3 - 4 full days (Gasarasi et al., 2000; Gyapong, Gyapong, Evans, Aikins, & Adjei, 1996a; Ramaiah et al., 2000). Though the coping mechanism works among chronic patients, they also fail to pursue their works at the same level as before (Babu et al., 2002; Gyapong et al., 1996a; Ramaiah et al., 2000). In India, for example, 32 % of the total days suffering from attacks are considered as a loss of any economic work among chronic patients due to lymphatic filariasis, and a loss of work is significant in those with lymphedema only, those with hydrocele only, and those with both lymphedema and hydrocele (Ramaiah et al., 2000). Women's productivities are also impaired by the disease in endemic regions (Bandyopodhyay, 1996; Coreil et al., 1998). Level of absenteeism is influenced by disease conditions as well as other personal characteristics such as age, gender, and

family type (Babu et al., 2002). Since the disease manifestations are more prevalent among householders, the family suffers from income shortage. In India, about 7 % of household income goes for the treatment of LF, and the cost of hydrocele surgery exceeds more than one-third of the average household income (Babu et al., 2002). Therefore, economic loss eliminates the possibility of recovery and threatens daily life. Then the economic difficulty indirectly affects negatively on social and psychological impairment among both patients and family (Babu et al., 2002). As a result, a single disease causes a vicious cycle of physical, social, psychological, and economic burdens.

Haiti

The Republic of Haiti is located on the island of Hispaniola, surrounded by the islands of Cuba and Jamaica on the west and Puerto Rico on the east. Haiti occupies a land area of 27,700 km^2 on the western-third of the island, and the rest is governed by the Dominican Republic. The nation consists of nine departments, 133 minicipalities, and 561 districts, with a total of 8.2 million people (PAHO, 1998; WHO, 2002b). Because of the high fertility rate (4.4 per woman), children under 15 years old accounts for 40 % of the total population (PAHO, 2003). On the other hand, people over 65 only account for 4 % due to low life expectancy at birth (52.8 years in males and 56 years in females) (PAHO, 2003). Haiti is also one of the most densely populated countries in Central and Latin Americas. Owing to the small territory with rapid increase of the population, the population density is 260 inhabitants per km^2 nationwide and 885 inhabitants per km^2 of cultivated land, as of 1995 (PAHO, 1998). More than one-third of the total population

(34.7%) are living in the capital, Port-au-Prince, and there is a tendency toward rapid increase of the urban population in recent years (PAHO, 1998). This basic demographic information is summarized in Table 2.

Table 2. Demographic Profile in Haiti. (PAHO, 1998; WHO, 2002b; PAHO, 2003)

Country name	The Republic of Haiti
Location	N 19”00, W 72”25, western one-third of Hispaniola
Land area	27,700 km^2
Capital	Port-au-Prince
Administrative divisions	9 departments, 133 minicipalities, 561 districts
Population	8.2 millions (1997)
15 years or younger	42 %
16-64 years	54 %
65 years or older	4 %
% living in capital	34.7 %
Total fertility rate (TFR)	4.4
Population density (nationwide)	260 people per km^2 (1995)
(cultivated land)	885 people per km^2 (1995)
Life expectancy at birth	52.8 years in male, 56 years in female

Haiti is categorized as one of the least developed countries in the world. Social service infrastructure is poorly established or nonexistent. All types of infrastructure such as water, sewage and sanitation systems, enviromental pollution due to the rapid increase of motor vehicles, and road networks are definitely inadequate (PAHO, 2003). Moreover, due to the chronic political instability and economic crisis, the actual gross domestic product showed decline to 1980’s level in late 1990s, and the unemployment rate exploded instead (PAHO, 1998; World Bank, 2002). Currently, more than 80% of the total population is below the poverty line (World Bank, 2002). The gross domestic product (GDP) per capita was US$460 in 1999 (World Bank, 2002), or 1,094 international dollars in 2000 (WHO, 2002b), both of which are the least amount in the Americas.

There is no systematic method to collect, process, and disseminate information on mortality in Haiti (PAHO, 1998). However, it is estimated that nearly one-half of all deaths happen during the first five years of life due to diarrheal diseases, acute respiratory infections, and malnutrition (PAHO, 1998). Vaccine-preventable diseases such as measles, diphtheria, and neonatal tetanus are still prevalent due to unsatisfactory vaccination rates. In 2000, vaccination coverage of measles, DTP3, and BCG was 75%, 45%, and 55%, respectively (PAHO, 2003). As a result, a certain number of vaccine-preventable diseases occur intermittantly. For adolescents and adults, both communicable and noncommunicable diseases are common. Tropical vector-borne diseases such as malaria and dengue fever as well as lymphatic filariasis are endemic. Malaria is found throughout the country but its occurrence is more frequent in rural coastal areas, varying year to year in relation to season and the amount of rainfall (PAHO, 1998). In 1999, 973 cases and 59 deaths attributed to *Plasmodium falciparun* were reported (PAHO, 2003). Likewise, dengue fever has been prevalent particularly in urban areas, though the epidemiological data are insufficient to estimate its magnitude (PAHO, 2003). The outbreak of more severe forms of dengue, including dengue hemorrhagic fever and dengue toxic shock symdrome, is a constant threat throughout the country (PAHO, 1998). Other communicable diseases such as tuberculosis, HIV/AIDS, sexually transmitted diseases (STDs), and zoonoses are also found all over the country. However, poor surveilance systems often cause underestimation in the entire nation.

Haiti is one of the most endemic countries with lymphatic filariasis. The presence of bancroftian filariasis in Haiti originated from the history of African slave trade (King & Freedman, 2000). Although the exact nationwide prevalence is unknown, it is

estimated that more than 20 % of the population in most coastal cities are carriers of microfilaremia (PAHO, 2001). In the city and surrounding areas of Leogane, for example, the prevalence of microfilaremia is about 25 %, approximately 5 % of women have a chronic symptom of elephantiasis, and the prevalence of hydrocele among men is up to 30% (Eberhard et al., 1996). Recently a filariasis mapping for children has completed (Beau de Rochears et al., in press). It shows that two major areas, Leogane and areas surrounding of Port-au-Prince, and the North Department, record the highest prevalence of microfilaremia.

Factors Associated with Lymphatic Filariasis and Lymphedema

There are complicated issues in socio-demographic variables associated with lymphedema due to LF. Age is greatly associated with the onset of symptoms. The identification of both microfilaria and symptomatic conditions is rare in early childhood, but the incidence increases as people get older (Gasarasi et al., 2000; Gyapong et al., 1996b; Hyma, Ramesh, & Gunasekaran, 1989; King & Freedman, 2000; Shriram et al., 2002; Weerasooriya, Weerasooriya, Gunawardena, & Samarawickrema, 2001). Likewise, the prevalence of lymphedema also increases as infected people get older. Shriram et al. (2002) found that, although the increase was stable between 20 and 30 years of age, it became significant afterwards.

On the other hand, the gender profile remains unclear. It is generally held that more females suffer from lymphedema than males. In Haiti, Lammie et al. (1993) found that the incidence of lymphedema was 5 – 10 times higher among females than males.

However, the tendency seems inconsistent in other areas of the world. Shriram et al. (2002) showed that more males experienced lymphedema than females in India. No significant gender differences were observed among elephantiasis patients with filarial fever in Sri Lanka (Weerasoriya et al., 2001). The unclear gender perspective also tends to occur in other filariasis conditions. Several studies mentioned that men generally had higher microfilaremia levels and some clinical features such as hydrocele than women (King & Freedman, 2000; Weerasooriya et al., 2001). Gasarasi et al. (2000) found that males experienced acute attacks more often than females in Tanzania; however, females had higher prevalence of acute attacks than males in Ghana (Gyapong et al., 1996b). Thus, the gender perspective is one of the important factors for consideration in LF elimination. More issues related to gender will be discussed in later chapters.

Socioeconomic status (SES) is an another important factor in LF. Filariasis principally affects persons of the lowest SES, especially those who are unable to protect themselves from mosquitoes sufficiently and/or who live in the mosquito-favorable environments (King & Freedman, 2000). Educational status as well as employment status of the household-head were positively associated with protection against mosquito vector contacts (Mwobobia & Mitsui, 1999). Place of residence is also a source of variation. It is known that the prevalence and characteristics of LF varies by region or even within the same community (Dreyer et al., 1998). Also, different populations infected with the same parasite can have very different clinical manifestations of the infection (Ottesen, 1987). In Haiti, most research has been conducted in the city and surrounding areas of Leogane only. Thus, different aspects of lymphatic filariasis would be observed within the country.

In terms of knowledge of the illness, the lack of current knowledge about filariasis

is a significant risk factor for higher rates of morbidity among those affected. Reports from several countries indicate that poor knowledge about LF significantly execerbates conditions and contributes to high risk behavior (Ahorlu et al., 1999; Eberhard et al., 1996; Gyapong et al., 1996a; Rauyajin et al., 1995). Particularly, in spite of the obvious recognition of both acute and chronic symptoms, there is almost no understanding of the etiology of these conditions and the role of mosquitoes that transmit the disease in Haiti (Coreil et al., 1998; Eberhard et al., 1996). In addition, the lack of knowledge is less likely to promote self-care practice at home. Since the simple daily care is important for the alleviation of the leg condition, the lack of knowledge would lead to the poor compliance and the lower self-efficacy of the self-care regimen at home, and therefore the QOL among patients would remain lower in their later life. However, there is little research about this issue and a more in-depth understanding is needed.

Certain occupations contribute to the high prevalence of LF. Because the distribution of the disease is in rural areas of the developing world, those engaging in agricultural-related work using water have higher chances of exposure. Particularly, it was reported that the rainy season was associated with more frequent episodes of acute attacks (Gasarasi et al., 2000; Gyapong et al., 1996b). Thus, the type of occupation and the prevalence of filariasis seems to be related. However, there is no information about such relationships in Haiti.

As mentioned in the section on lymphedema, comorbid conditions related to filariasis are likely to affect lymphedema patients. An acute attack is one of the most common complications. In Tanzania, 61.3 % of lymphedema patients developed ADL (Gasarasi et al., 2000). Also, ADL is more frequent among patients with lymphedema

than hydrocele in Ghana (Gyapong et al., 1996b). In addition, recurrent bacterial infections facilitate the progression of lymphedema to elephantiasis (Dreyer et al., 1998).

Gender Perspective

The gender perspective is an important aspect of LF. There is a lot of controversy regarding gender differences in LF. From an epidemiological standpoint, the prevalence of infection is often higher among men than women during the childbearing years (Dreyer et al., 1998). Also, males have higher microfilaremia levels and clinical symptoms because of a frequent consequence of hydrocele (King & Freedman, 2000; Weerasooriya et al., 2001); in contrast, females experience a higher incidence of lymphedema and ADL (Gyapong et al., 1996b; King & Freedman, 2000). However, the opposite results have also been reported in different regions (Gasarasi et al., 2000). These outcomes indicate that the risk factors of infection by gender vary by location.

Though several studies have focused on females, there has been little attention to the disease among males in Haiti. At the same time, QOL among chronic patients is also a gender sensitive issue. Because the nature of the body disfigurement differs by gender, it affects their QOL in a different manner. Above all, because of higher prevalence of chronic conditions and social ignorance about the disease among females, research among males is quite limited. The dominant symptomatic condition among males, hydrocele, also makes it difficult to intervene in some cultures because of the location of the disfigurement. Therefore, this study also aims at a gender comparison of filarial infection on risk factors and QOL.

Quality of Life

Lymphatic filariasis is known as the disease which is the second leading cause of disability worldwide (WHO, 1995). Since mortality is rarely an issue in filariasis, acute attacks and several chronic conditions greatly affect their QOL. One of the obviously negative aspects is that acute attacks and clinical manifestations limit physical activity. Reports in endemic countries indicate that both acute and clinical manifestations significantly hamper daily activities of infected people, especially women engaging in housework such as cooking, cleaning, washing and bringing up children (Ramaiah et al., 1997; Ramaiah et al., 2000). Male patients also go through the impairment of sexual function due to hydrocele (Ahorlu et al., 2001). In the Haitian case, more than 70 % of patients with lymphedema in Haiti experienced limited physical activities due to acute attacks (Dahl, 2001). In relation to physical activities, economic loss is another burden among infected persons. Many studies show that symptomatic conditions forced people to reduce their economic productivity or even stay at home all the time. In particular, those with ADL are affected much more severely. Although chronic patients are usually capable of maintaining their economic activities at some level (Gyapong et al., 1996a), it is almost impossible for those with ADL to have any income during the period of symptoms (Ahorlu et al., 1999; Babu et al., 2002; Gyapong et al., 1996a; Ramaiah et al., 1997; Ramaiah et al., 2000). However, it is still significant that there is a regional difference in loss of work based on gender (Babu et al., 2002; Ramaiah et al., 2000). In addition, since the economic loss not only reduces their income but directly increases the

proportion of treatment cost in a family, patients' health-seeking behavior is restricted (Gyapong et al., 1996a). Hence, they are more likely to endure their painful conditions.

Psychosocial burden and QOL are strongly related in filariasis patients. Social stigma and discrimination prevent them from participating in the community and society as well as induce mental and psychological stress among them due to their abnormal physical features (Bandyopadhyay, 1996; Coreil et al., 1998). Patients with hydrocele also face a severe psychosocial burden (Ahorlu et al., 2001; Gyapong et al., 2000). However, surgical repair of hydrocele greatly improves QOL both physically and mentally, even though its cost is prohibitive in resource poor countries (Ahorlu et al., 2001). Physical disability also makes a negative psychosocial impact on not only patients *per se* but also their family and community. Coreil et al. (1998) found that patients experienced difficulties in maintaining a good relationship with their family, and that the family underwent social discrimination and ostracism from the community. Therefore, QOL among lymphedema patients is likely to be considered poor.

On the other hand, effective morbidity control programs have a great impact on communities. Coreil et al. (2003) reported that successful support group activities in a filariasis endemic area of Haiti showed significant improvement on patients' QOL. However, even if the treatment regimen of lymphedema was well introduced in the community, patients often felt unconfortable following some practices such as bandaging and elevation of the legs due to discomforts, pain, itching, and tightness of bandages (Coreil et al., 1998). Therefore, it is important to make an additional control strategy by careful understanding of QOL among them.

There is no gold standard in QOL assessment for chronic patients due to

lymphatic filariasis. Several different QOL measurement forms for chronic diseases have been established and widely available over the last few decades. Yet, there are challenges for QOL assessment of lymphedema patients due to LF by using health-related QOL measurements. The latest try attempted QOL assessment of the introduction of hygiene and skin care regimens in Guyana, using the Dermatology Life Quality Index (DLQI) (McPherson, 2003). It was concluded that the improved DLQI scores after the regimen indicated that the morbidity management by trained nurses was an effective intervention to enhance their QOL. However, the sample size was small (n=15), and the validity and reliability of the measurement was established only when lymphedema was considered as a skin disease.

Another QOL study among lymphedema patients was conducted by the Nottingham Health Profile (NHP) to evaluate conservative treatment for general chronic lymphedema patients rather than lymphedema due to LF (Sitzia & Sobrido, 1997). However, the reliability and validity of the questionnaires was not established, and the study concluded that the first part of NHP was less useful for QOL assessment among them so that the authors recommended other assessment tools such as the SF-36, the MOS 36-item short-form health survey (Ware & Sherbourne, 1992).

Pereira de Godoy, Braile, de Fatima Godoy, and Longo (2003) recently examined the QOL among lymphedema patients with the SF-36. Though the objective of the assessment was designed not only for those due to LF but for general lymphedema patients, the researchers concluded that both physical and mental health as well as social interaction among the lymphedema group showed a statistically significant lower QOL. However, in addition to the small sample size (n=23), neither does Haitian Creole version

of SF-36 exist in QualityMetric, Co. Ltd, the organization which retains the right to access SF-36, nor have translation efforts among researchers been accepted. Therefore, it is currently impossible to conduct the QOL assessment among Haitian lymphedema patients with the SF-36.

Therefore, it would be beneficial to introduce other QOL assessment tools among lymphedema patients. Considering the characteristics of the disease manifestation, there are several generic instruments which could apply to Haitian lymphedema cases. One of the most commonly used instruments is the EuroQol Instrument, developed by the EuroQol Group, a consortium of five European countries in 1987. It is designed to examine the feasibility of jointly developing a standardized non-disease-specific instrument for describing and valuing health-related QOL (Brooks, 1996). The test consists of two parts: EuroQol five-demension health scale (EQ-5D) and EuroQol Visual Analogue Scale (EQ-VAS). EQ-5D consists of five questions from five different health-related concepts each: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each question has three different answers, and respondents have to choose one of them, on the basis of the current day's health status. Thus, there are 3^5 = 243 possible combinations to describe one's health. These outcomes are weighted by EuroQol group guidelines. On the other hand, the EQ-VAS measures one's overall health status by pointing a 20cm vertical visual analogue scale, which ranges from zero as a worst imaginable health state to 100 as a best imaginable health state. Like EQ-5D, EQ-VAS also assesses current health status. A number of researchers have used the EuroQol in QOL assessment for various chronic diseases (e.g. Fransen & Edmonds, 1999; Hurst, Kind, Hunter, & Stubbing, 1997; Konig et al., 2002; Myers & Wilkes, 1999).

Another widely used form is the CDC Healthy Days questionnaire, developed by CDC (2000). It is a compact set of measures about recent perceived physical and mental health status and activity limitation. The latest version of the questionnaire consists of three parts: four general questions of self-determined health condition, five measures of acitvity limitation, and five additional statements regarding QOL. The first four core questions assess self-rated general health status, the duration of the unhealthy condition regarding physical and mental health, and the length of activity limitation due to both poor physical and mental health. Each question except the first one requires the answer during the past 30 days. The second part, five measures of acitvity limitation, assesses the major cause and duration of limitation and how it affects people's routine and personal care only if they have any activity limitation. The last part evaluates the length of unhealthy days due to pain, depression, anxiety, sleeplessness, and vitality within last 30 days. CDC (2000) indicates that the Healthy Days measures are useful for identifying health disparities, tracking population trends, and building broad conditions around a measure of population health compatible with the definition of health by WHO. Particularly, the questionnaires are more focused on activity liminations so that the context would be suitable for the evaluation of lymphedema-oriented QOL.

For assessing QOL in mental health, Center for Epidemiologic Studies Depression Scale (CES-D) developed by Radloff (1977) in National Institute of Mental Health is widely used. It is a 20-question self-reporting scale to evaluate one’s depressive condition in the past week by four simple scores. Most of the above questionnaires ask about negative experiences but some assess positive atittudes of respondents.

Reliability and Validity of the Quality of Life Measurements

Since the reliability and validity of the generic QOL instruments are not yet established in filariasis-endemic Haitian communities, it is important to assure the quality of the measurements prior to a survey administration. Reliability is the extent to which a measure yields consistent results. In other words, it looks at the extent to which scores are free of random error. Ary, Jacobs, and Razavieh (2002) explains that three different consistency measures or reliability coefficient (r_{xy}) are widely used for reliability measurement: 1) test-retest coefficient; 2) alternate-form coefficient; and 3) internal-consistency coefficient. The test-retest coefficient is one derived from correlating individuals' scores on the same test in two different administrations with a certain interval. The alternate-form coefficient comes from correlated individuals' scores on different sets of equivalent items. The calculations of these two coefficients require laborious works due to at least two administrations of the same test or two equivalent test forms. On the other hand, the internal-consistency coefficient is based on the relationship among scores derived from individual items or subsets of items within a single test so that only one administration of the test is necessary. Common measurements for internal-consistency coefficients are coefficient alpha developed by Cronbach (1951) and the Spearman-Brown formula for split-half reliability methods.

Although reliability is related to the consistency of a scale as a measure of a specific variable, validity is associated with its adequacy. DeVellis (2003) summarizes that validity mainly consists of three categories: content validity, criterion-related

validity, and construct validity. Content validity is the extent to which a specific set of measurements reflects a content domain. It is often easier to assess it when the domain is clearly defined, but more difficult when measuring attributes such as beliefs, attitudes, or disposition due to their ambiguous conceptualization (DeVellis, 2003). Criterion-related validity is the extent to which a measure is empirically associated with another measure or procedure, such as a gold standard in that field. Thus, it is used to demonstrate the accuracy of a measure used in a study. Construct validity is the extent to which a question correlates with other measures that it should correlate with. It indicates how much a theoretical construct or hypothesis agrees with a specific measurement. It can be subcategorized into convergent validity and discriminate validity. Convergent validity looks at how much theoretically related measures agree with one another. Discriminant validity, on the other hand, indicates how much theoretically unrelated measures show a lack of the relationship with one another.

For the EuroQol, Brooks (1996) summarized the following issues. He notes that the test-retest reliability for the standard EuroQol questionnaires for the general Dutch population could be established by the generalizability study, a study focused on determining to what extent scores are comparable across different levels of a facet (van Agt, Essink-Bot, Krabbe, & Bonsel, 1994). They concluded that four different versions of questionnaires generated stable valuations over time. Good test-retest reliability (Intraclass Correlation Coefficient [ICC] = 0.78) was also obtained for the visual analogue scale of EuroQol instrument among healthy British people (Gudex, Dolan, Kind, & Williams, 1996). For those suffering from chronic conditions such as rheumatoid diseases and inflammatory bowel disease, ICCs of 0.70 - 0.85 indicated that there was

moderate to high level reliability of the EuroQol questionnaire (Fransen & Edmonds, 1999; Hurst et al., 1997; Konig et al., 2002).

On the other hand, Brazier, Jones, and Kind (1993) made a comparison of the validity between the EuroQol instrument and the SF-36. They concluded that there was reasonable evidence for construct validity in the EuroQol dimension responses and the total scores, by comparing the percentages of each health problem with socio-demographic variables such as age. Also, the authors figured out that convergent and discriminant validity had a reasonable agreement between EuroQol and SF-36 in the general population. Although the outcome of EuroQol was less variable than SF-36 due to the limited number of questionnaires and answers, they suggested that it was more applicable for a general population and suitable for those with major morbidity. The validity studies were performed for several chronic disease conditions, and similar performances of construct and criterion-related validity were observed (Fransen & Edmonds, 1999; Hurst et al., 1997; Konig et al., 2002; Myers & Wilks, 1999). However, the results were not consistent by the type of disease, possibly because of ceiling effects due to the simplicity of the questionnaires in EuroQol. Myers and Wilks (1999) suggested that the EuroQol was a useful rapid-assessment means for chronic fatigue syndrome patients, and Coons, Rao, Keininger, and Hays (2000) indicated that EQ-5D was generally a preference-based measure designed to summarize the QOL. However, no investigation has been conducted in lymphatic filariasis or chronic lymphedema.

There is much less discussion of reliability and validity of the CDC Healthy Days instrument, but CDC has documented relevant studies in the publication “Measuring Healthy Days”. It reported that good internal consistency reliability was established

among 2400 Norwegian adults (CDC, 2000, p.17). Also, acceptable test-retest reliability was found among Americans who suffered from known disabilities (CDC, 2000, p.17). Validity of the measurements was more carefully examined in various situations (CDC, 2000, pp.15 - 19). Good construct validity was established in studies of statewide normal adults, low-income elderly, those with disabilities, and low-income older male minorities, especially in terms of socio-demographic status and disease conditions. Also, acceptable or good correlations with SF-36 and CES-D questionnaires were found in several health-related domains. However, like the EuroQol, the application of the CDC Healthy Days is a challenge in the Haitian LF cases.

In contrast, such arguments for CES-D have been active for more than two decades. Radloff (1977) reported in his article that very high internal consistency was established by different types of reliability measurements among general population and psychiatric patients. He found that reliability coefficients of from 0.77 to 0.92 were obtained by coefficient alpha, split-halves r, and spearman-brown methods. Also, moderate but stable test-retest reliability was observed in different intervals of retest administrations. All but one gained the range of 0.45 - 0.70 on 2, 4, 6, and 8 weeks intervals of mail back administrations and 3, 6, and 12 months of reinterviews. The author also showed substantial to excellent evidence of criterion-related validity and construct validity. Criterion-related validity was established by looking at patterns of correlations with other self-report measures such as the Lubin and Bradburn Negative Affect scale. Though the result was at an acceptable level, comparisons with the variety of self-reported measures helped document concurrent and discriminant validity. In addition, overall construct validity was established by examining correlations with

clinical ratings of depression and by relationships with other variables such as socio-demographic indicators. Therefore, CES-D is a strong indicator for looking at current mental health status so that the questionnaires are expected to be applied well among the lymphedema patients in Haiti.

Chapter Three

Methods

Study Design

The thesis is based on the analysis of secondary data obtained from a cross-sectional, correlational study along with a descriptive epidemiological survey. A cross-sectional study is a field study that collects data about activities, events, or other experiences at a single point of time. It is easier and less expensive to perform than longitudinal studies, and allows us to generate and test hypotheses. The disadvantages are that it cannot establish temporal relationships between variables, there are potential biases in the selection of the population/sample, and it cannot control potential confounders. However, the study also allows researchers to evaluate multiple risk factors and outcomes. A correlational study is a study that describes and postulates the associations between variables of interests by using correlation coefficients. It is useful to obtain a first look at the population, but does not control for potential confounding factors. Finally, a descriptive study is a study that describes the existing distribution of variables without regard to causal associations. Therefore, the thesis intends to investigate associations between socio-demographic variables and filariasis-related variables among Haitian patients and to describe the QOL among them at a certain point in time.

Objectives

The purpose of the study consists of two main objectives. The first objective is to observe the association of filariasis-related variables among lymphedema patients. The variables include demographic characteristics, illness history, knowledge of lymphedema, and self-care practice and behavior related to the illness. The risk factors for the filarial infection have been identified through various international studies; however, risk factors are sensitive to the environment and people's life style (King & Freedman, 2000). Also, different populations infected with the same parasite can have very different clinical manifestations of the infection (Ottesen, 1987). Moreover, Haiti is a country mixing western hemisphere with indigenous culture so that it is anticipated that any demographic variables, knowledge about the disease, or their unique daily custom and behavior may influence the disease. This cross-sectional correlational study also includes the consideration of regional differences and gender perspectives. The prevalence and characteristics of LF can vary by region or even within the same community (Dreyer et al., 1998). Above all, since there is no research on the regional comparisons of LF in Haiti, the assessment of multiple communities is noteworthy for future filariasis management in Haiti. There are some differences known about the clinical manifestations and social and behavioral factors by gender (Bandyopadhyay, 1996; Coreil et al., 1998), but they are still poorly understood. In Haiti, there has been no systematic comparison of gender perspectives, especially no representative information on men with LF in Haiti. Therefore, understanding the gender perspective of lymphatic filariasis is significant for

morbidity management. It will be clarified by careful consideration of demographic, social, and behavioral factors associated with the disease.

The other objective is to evaluate the QOL among lymphedema patients. As mentioned above, morbidity control is one of two main strategies for the global elimination of LF. However, since there are few systematic QOL assessments of lymphedema due to various limitations such as sample size and reliability and validity of the measurements, the obtained information has limited utility for morbidity control. Therefore, a general introduction of the QOL assessment is highly recommended.

To fulfill the primary objective, secondary data collected for the ongoing project called Evaluation of Support Groups in the Management of Lymphedema Caused by Lymphatic Filariasis was used. The survey form was created on the basis of the questionnaires previously used in a survey in Leogane. In the project, the form was designed for the assessment of background information about LF in three rural Haitian towns. The data includes socio-demographic information, illness history, foot exam, knowledge of the illness, self-care practice, and self-efficacy of the care. The form can be viewed in Appendix B. Regional assessments and gender comparisons were achieved by the evaluation of each questionnaire by regions and gender, respectively.

The second objective, the QOL assessment is also a part of the ongoing project, but establishing the reliability and validity of the instruments is an original work for this thesis. The generic QOL tools include the CDC Healthy Days Survey and EuroQol. CES-D, Center for Epidemiologic Studies Depression Scale was also applied for a future reference of mental health assessment of lymphedema patients. Due to the high illiteracy rate, interviews were conducted by trained personnel using Creole-language forms. Also,

since there are few representative reports of reliability and validity of the questionnaires among lymphedema patients, a basic discussion of these issues was considered through application of commonly used validation procedures.

Therefore, following research questions will be of interest in this research.

Research questions

1. How is the condition of LF manifested in three rural Haitian towns?
   1.1. To what extent does place of residence influence lymphedema conditions?
   1.2. To what extent are socio-demographic variables such as age, gender, and SES associated with lymphedema conditions?
   1.3. What is the knowledge of the illness and history of the illness?
   1.4. How does the lymphedema condition interact with the frequency of comorbid condition such as acute attacks?

2. How do patients' health-related behaviors affect morbidity control in their daily lives?
   2.1. How do LF patients seek treatment for their legs?
   2.2. How do place of residence, SES, and the cost of medication affect on treatment-seeking behavior?
   2.3. To what extent do previous illness history and knowledge of the illness interact with help-seeking behavior?
   2.4. What is the effect on self-efficacy?

3. How does the condition of lymphedema affect quality of life?
   3.1. To what extent does the difference of the place of residence influence on QOL?
   3.2. To what extent are differences of socio-demographic variables such as age, gender, and SES associated with the QOL among lymphedema patients?
   3.3. To what extent are differences observed between lymphedema stage and QOL, such as morbidity, physical limitation, and anxiety/depression?
   3.4. What is the association with knowledge of the illness and illness history?
   3.5. To what extent do simultaneous symptoms exacerbate QOL?

4. To what extent do the generic QOL assessment tools for chronic diseases have reliability and validity for measuring QOL among lymphedema patients due to LF in Haiti?

Population and Sample Size

The dataset came from an ongoing research project titled Evaluation of Support Groups in the Management of Lymphedema Caused by Lymphatic Filariasis. A collaboration between Haitian and US public health institutions expanded the successful support group intervention among lymphedema patients in Leogane, Haiti, which was funded by WHO (Coreil et al., 2003). The dataset included background information among LF patients living in one of the most LF endemic areas located north of the nation's capital. Thus, the dataset was primarily aimed to provide the baseline information prior to support group introduction in the new areas.

The data were collected in three localities, Arcahaie, Cabaret, and La Plaine. Arcahaie is a coastal town situated 30 miles north of the capital, Port-au-Prince. Cabaret is another community located between Port-au-Prince and Arcahaie. Both towns are situated on or near the main northern highway Route National No. 1 within L'*arrondissement d'Arcahaie* (District of Arcahaie). Particularly, Cabaret is just right of the main highway so that it is more urbanized than Arcahaie. However, sampling in Cabaret included more residents from the rural zones so that the effect of urbanization seems to be lower. On the other hand, La Plaine is a dispersed area that is a part of *La Commune de Delmas,* (Delmas County) on or near Route National No. 1. The community

of Delmas is one of six communities in L'a*rrondissement de Port-au-Prince* (District of Port-au-Prince), which includes the metropolitan area. Therefore, residents in La Plaine have greater access to the capital due to its closeness to the metropolitan area. The locations of these localities except La Plaine are available in Appendix C. Though the exact population size in each town is unknown, it is estimated to be 100,000 for Arcahaie, 60,000 for Cabaret, and 10,000 for La Plaine. The target population was lymphedema patients of all ages. The prevalence of lymphedema is poorly understood because there is no case reporting on surveillance in these areas. However, Beau de Rochars et al. (in press) figured out that these communities were in three of the most filariasis endemic areas in the country, based on the national mapping of infected school children. The towns are also located in one of two regions which have the highest prevalence of microfilaremia. Therefore, analysis of the data collected in these towns would be one of the most representative information about LF in Haiti.

The sample size of the project was based mainly on the information collected on the preliminary census in early 2003. At that time, at least 60 and 25 adult lymphedema patients were found in Arcahaie and Cabaret, respectively. Since the census was conducted in a short period of time with a minimum effort, it was anticipated that many more people suffering from lymphedema were collectible as samples. Also, population data were unavailable so that the statistical calculation of the sample size was impossible. Thus, the sample size was based on resources available for the study and patients available in the study site. Fortunately, a total sample of 316 were able to be collected , including 123 in Arcahaie, 72 in Cabaret, 120 in La Plaine, and 1 unknown site.

Sampling Method

The sample was based on the availability of patients. Since the study was focused on a particular condition of a single disease and there was no list or information of the study population, non-probability sampling was conducted instead of probability sampling. Non-probability sampling is one of two sample selections that researchers can make a subjective decision for the characteristics of samples. It is especially appropriate when resources for samples are limited, the members of a population are difficult to identify, or the list of a population is unavailable. Because samples cannot be collected by random selection such as probability sampling, it is difficult to reduce or eliminate potential biases and confounders. There are several types of non-probability samplings. Henry (1990) lists six major designs of non-probability sampling: convenience, most similar/dissimilar, typical cases, critical cases, snowball, and quota. Of those, the approach in this project was more likely to be convenience sampling – that a group of individuals who are available for a study, or quota sampling – that interviewers select a member of samples until filling out quota.

Interviews were conducted in the infectious disease department of the local hospital in Arcahaie and the public clinic in Cabaret and La Plaine, or in people's homes. It was restricted by person-to-person interview only, due to the nearly 50% of nationwide illiteracy rate. A team of trained interviewers conducted the interviews. A small refreshment and transportation fee was provided at the end of the interview. Informed consent was obtained prior to the data collection.

Measurement

The questionnaires used in this study had two different formats. The first form, Filariasis Baseline Evaluation Survey, was a set of questions adapted from a previous filariasis survey in Leogane, Haiti. It consists of six different categories: demographics, illness history, foot exam, knowledge about the illness, self-care practices for leg, and self-efficacy. All the items were written in both English and Haitian Creole, although the instruments were administered in Creole only. The contents of each category are summarized in Table 3. Also, the full questionnaires are available in Appendix B.

Table 3. Brief Summary of the Survey Categories and Questionnaires.

Demographic: address, gender, age, marital status, general information about their living children, religion, occupation, educational level, literacy, economic scale.	**Illness history**: age of first awareness of the illness, first impression of the illness, recognition of the first symptom, treatment of the illness, precautions taken with one's foot, number of acute attacks in the past year, presence of comorbidity of lymphedema and acute attacks.
Foot exam: the sizes of foot (10cm from toe), ankle (10cm from floor), and leg (20cm from floor) for both limbs, the stage of illness (stage 1 to 7, from mild to severe), location and condition of lesions.	**Knowledge about the illness**: what the respondent thinks is the cause of the illness, which care options can help one's lymphedema, which care options can be done to help prevent acute attacks and what treatments are available, what kinds of care can be provided to ease one's acute attacks.
Self-care practice for legs: what kinds of practices and how often one does each for self-care of the legs daily, once a week, once a month, or less often.	**Self-efficacy**: how confident they feel in their ability to practice all the care techniques available to take care of their legs.

The other form was a combination of two generic QOL assessment tools, the CDC Healthy Days Survey and EuroQol, and a subjective well-being assessment tool, CES-D. All were translated by researchers who engaged in research on LF in Haiti. As mentioned in the previous chapter, these forms were designed for assessing one's general health condition. Particularly, the CDC Healthy Days is more focused on activity limitation, CES-D is a common mental health indicator, and the EuroQol evaluates five health dimensions of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The forms are available in Appendix B.

Reliability and Validity

In order to confirm to what extent the measurements have reliability, coefficient alpha or Cronbach alpha was calculated. One of the reasons that the Cronbach alpha was selected is that this is a cross-sectional study. Since the project was only a single time administration, test-retest reliability could not be introduced. The second reason is that, due to the limited period of survey administration and no alternative equivalent assessment tools, alternate-form reliability was excluded for reliability measurement. In addition, it was impossible to use the Kuder-Richardson Procedure because there were no dichotomous measures in the questionnaires. Therefore, the internal-consistency reliability formula was used to confirm the reliability of the instruments. The formula for coefficient alpha is as follows:

$$\alpha = (K/(K-1))*((s_x^2 - \sum s_i^2) / s_x^2),$$

where, K = number of items on the test

Sx^2 = variance of the test scores for all K-items

$\sum Si^2$ = sum of variances of the item scores.

There are some limitations for these tests. Coefficient alpha assumes that the items on the form are homogeneous. Since EuroQol and the CDC Healthy Days are designed for evaluating one's general health, the questionnaires include different domains of health status such as physical and mental health and disability. Thus, overall alpha might be lower than expected.

On the other hand, establishing validity required more elaborate procedures. Criterion-related validity was observed by comparing a single domain in one form with a related from in another, EuroQol and the CDC Healthy Days. Also, CES-D is a mental health measurement only so that the questionnaires in CES-D were used in comparison with comparable domains in the other two forms. The approach to construct validity was dependent on the previous findings or constructs that have already been established in the literature, because it is impossible to prove the validity of a measure. According to the literature review in the previous chapter, the relationships between certain characteristics of the symptoms and a dimension of the questionnaires would be expected. For example, since people with lymphedema in Haiti experienced limited physical activities due to acute attacks (Dahl, 2001), they would be expected to claim more activity limitations in the CDC Healthy Days. It has been reported that women with abnormal physical features due to lymphedema experience mental and psychological stress (Bandyopadhyay, 1996; Coreil et al., 1998). This suggests that they would have a higher score on the

anxiety/depression scale in EuroQol and CDC Healthy Days and in many of the questionnaires in CES-D. Also, SES would be expected to affect responses to the questionnaires. Thus, construct validity was established by analyses of the hypotheses shown above by using statistical tests such as correlational analysis. Lastly, convergent and discriminant validity was established by comparing the most similar and dissimilar health domains of the questionnaires of one form with another. For example, the EQ-VAS scale in EuroQol and self-determined overall health condition in the CDC Healthy Days should be correlated each other because both domains address the general health of respondents. Likewise, mobility questions in EuroQol also should be correlated with activity limitation questions in the CDC Healthy Days. On the other hand, there should be no or weak relationships between anxiety and depression scales and physical health status. Content validity was not examined because it is beyond the purpose of this thesis.

Data Analysis

All the data were analyzed using SAS version 8.02 (SAS Institute Inc, Cary, NC). The Filariasis Baseline Evaluation Survey was described by simple descriptive statistics. Each category was summarized by variables of interest for a general profile of the sample. Some of the categories such as knowledge about the illness, self-care practices for legs, and self-efficacy were utilized as QOL measurements so that simple bivariate statistical analysis such as t-test, correlation, chi-square test, and others as appropriate were performed between variables of interest including socio-demographic indicators and self-care practices for leg. On the other hand, scores from the QOL measurements were

analyzed by following the guidelines for each QOL evaluation instrument, in addition to the establishment of reliability and validity discussed in the previous section. The variables investigated in the Filariasis Baseline Evaluation Survey were used for further analyses of QOL. For instance, the scores obtained in the QOL instruments were examined by variables of interest such as age and gender, and compared by simple statistical tests to observe the differences between them.

Chapter Four

Results

General Information

The research was reviewed and approved on February 17, 2004, for ethics in human subject research by the Institutional Review Board at University of South Florida.

Demographics

Table 4 shows the demographic characteristics by gender and regions. Of 316 total respondents, there were 255 (80.7 %) females and 61 (19.3 %) males, and 120 people lived in Arcahaie, 72 in Cabaret, and 123 in La Plaine (1 missing). The gender proportion was slightly different among towns. There were 2.78 times more females than males in Cabaret, but 6.23 times in La Plaine. The mean age was 44.52 years. No significant age differences were found for either gender or regions. There was almost no previous visit of Ste. Croix Hospital in Leogane, where a lymphatic filariasis treatment program is currently available.

The demographic characteristics were nearly identical for males and females as well as across towns. Statistically significant differences were found only in marital status between gender (χ^2=14.89, df=6, p=0.02), occupation by gender (χ^2=90.07, df=5, p<0.01) and regions (χ^2=44.26, df=10, p<0.01), and working days per week by gender

(T=-3.11, df=81.7, p<0.01) and regions (F=8.76, df=2, 19, p<0.01). In marital status, *plase* was the most common status in both genders, but the proportion of single respondents was also the highest among males. Type of occupation varied by gender. More than 35 % of respondents were engaged in vending at home or market, but it was exclusively a female-dominated job. On the other hand, agriculture-related work was more common among men. This fact may affect the difference on working days per week. However, there was no significant gender difference in average income. The regional differences were also obvious in occupation. There were more vendors in Arcahaie and La Plaine, but more farmers in Cabaret, probably due to the difference in gender distribution. Working days per week were also different by region (F=8.76, df=2, 194, p<0.01); however, no significant regional differences were found in average income.

Table 4. Demographic Characteristics of Lymphedema Patients (#: 1 missing, *: % total, *: different between gender (p<0.05), **: different among towns (p<0.05), US $1 = 42.5 Haitian Groude (Gde) as of 2/18/04).

		Total	Gender		Town #		
			Male	Female	Arcahaie	Cabaret	La Plaine
Number of respondents (N (%*))		316 (100)	61 (19.3)	255 (80.7)	120 (38.1)	72 (22.9)	123 (39.1)
Age (mean ± SD (range))		44.5 ± 18.4 (9 – 95)	43.5 ± 20.7 (9 – 95)	44.8 ± 17.9 (9 – 90)	43.5 ± 18.5 (10 – 90)	44.9 ± 17.7 (12 – 86)	45.1 ± 18.9 (9 – 95)
Visit of Ste.Croix Hospital (n)		3	0	3	2	0	1
Marital status (n (% N)) **	Married	47 (14.9)	10 (16.4)	37 (14.5)	18 (15.0)	8 (11.1)	21 (17.1)
	Plase	115 (36.4)	17 (27.9)	98 (38.4)	36 (30.0)	31 (43.1)	48 (39.0)
	Live together	9 (2.9)	2 (3.3)	7 (2.8)	4 (3.3)	3 (4.2)	2 (1.6)
	In relationship	21 (6.7)	5 (8.2)	16 (6.3)	10 (8.3)	4 (5.6)	7 (5.7)
	Single	44 (13.9)	17 (27.9)	27 (10.6)	17 (14.2)	7 (9.7)	20 (16.3)
	Separated/divorced	41 (13.0)	5 (8.2)	36 (14.1)	20 (16.7)	10 (13.9)	10 (8.1)
	Other	36 (11.4)	5 (8.2)	34 (13.3)	15 (12.5)	9 (12.5)	15 (12.2)
Those who have living children (n (%*))		239 (75.6)	36 (59.0)	203 (79.6)	84 (70)	58 (80.6)	96 (78.1)
Number of living children (mean ± SD (range))		2.8 ± 2.5 (0 – 11)	2.5 ± 2.6 (0 – 8)	2.9 ± 2.5 (0 – 11)	2.5 ± 2.5 (0 – 9)	2.8 ± 2.3 (0 – 8)	3.1 ± 2.7 (0 – 11)
Age of oldest child (mean ± SD (range))		25.1 ± 13.7 (0 – 65)	25.2 ± 13.0 (2 – 55)	25.1 ± 13.9 (0 – 65)	25.6 ± 14.2 (1 – 65)	25.1 ±13.6 (0 – 55)	24.6 ± 13.5 (1 – 60)
Age of youngest child (mean ± SD (range))		15.8 ± 11.0 (0 – 50)	13.4 ± 10.0 (0 – 35)	16.3 ± 11.2 (0 – 50)	16.8 ± 10.6 (2 – 46)	14.8 ± 12.1 (0 – 46)	15.6 ± 10.9 (0 – 50)
Number of children who go/went to school (mean ± SD (range))		1.5 ± 1.9 (0 – 11)	1.5 ± 2.0 (0 – 7)	1.5 ± 1.9 (0 – 11)	1.3 ± 1.7 (0 – 6)	1.5 ± 2.0 (0 – 7)	1.6 ± 2.1 (0 – 11)

(Continued on the next page)

Table 4 (Continued).

		Total	Gender		Town		
			Male	Female	Arcahaie	Cabaret	La Plaine
Religion (n (% N))	Catholic	156 (49.4)	32 (52.5)	124 (48.6)	56 (46.7)	34 (47.2)	66 (53.7)
	Protestant	121 (38.3)	18 (29.5)	103 (40.4)	45 (37.5)	29 (40.3)	46 (37.4)
	Voodooist	11 (3.5)	1 (1.6)	10 (3.9)	5 (4.2)	2 (2.8)	4 (3.3)
	No religion or other	27 (8.5)	10 (16.4)	18 (7.1)	14 (11.7)	7 (9.7)	7 (5.7)
Occupation (multiple answers) (n (% N)) * **	Farmer	44 (13.9)	28 (45.9)	16 (6.3)	20 (16.7)	20 (27.8)	4 (3.3)
	Seller at home	66 (20.9)	1 (1.6)	65 (25.5)	18 (15.0)	16 (22.2)	32 (26.0)
	Seller at market	52 (16.5)	0 (0)	52 (20.4)	30 (25.0)	9 (12.5)	13 (10.6)
	Tailor / seamstress	17 (5.4)	2 (3.3)	15 (5.9)	4 (3.3)	1 (1.4)	11 (8.9)
	Unemployed	90 (28.5)	13 (21.3)	77 (30.2)	31 (25.8)	19 (26.4)	40 (32.5)
	Other	64 (20.3)	21 (34.4)	43 (16.9)	23 (19.2)	9 (12.5)	32 (26.0)
Number of working days per week (mean ± SD) * **		5.2 ± 2.0	5.9 ± 1.5	5.0 ± 2.1	4.4 ± 2.2	5.6 ±1.7	5.6 ± 1.8
Income per day (Gde (US$))		332.2 ($7.8)	415.1 ($9.8)	309.5 ($7.3)	416.5 ($9.8)	350.8 ($8.3)	250.5 ($5.9)
Able to read and write (n (% N))		192 (60.8)	41 (67.2)	151 (76.1)	74 (61.7)	38 (52.8)	79 (64.2)
Number of school years completed (mean ± SD (range))		3.9 ± 4.3 (0 – 15)	4.1 ± 4.3 (0 – 14)	3.8 ± 4.3 (0 – 15)	4.4 ± 4.5 (0 – 15)	2.9 ± 4.0 (0 – 14)	3.9 ± 4.3 (0 – 14)
Number of people having: (n (% N))	Radio	238 (75.3)	44 (72.1)	194 (76.1)	98 (81.7)	52 (72.2)	88 (71.5)
	Storage set	121 (38.3)	21 (34.4)	100 (39.2)	55 (45.8)	27 (37.5)	38 (30.9)
	Living room	69 (21.9)	11 (18.0)	58 (22.8)	18 (15.1)	16 (22.2)	35 (28.5)
	Bicycle/motorcycle	141 (44.6)	31 (50.8)	110 (43.1)	76 (63.3)	35 (48.6)	30 (24.4)

Illness History

In order to describe the first experience of the illness and its related health behaviors that respondents had, the responses regarding illness history were described in Table 5 - 8. A chi-square test was conducted to look at gender and regional differences at the significance level of $\alpha = 0.05$.

Table 5 shows the age at which the respondent first noticed symptoms and what the perceived illness was. The mean age was 28.0 years old, and this was consistent for gender and regions. About a quarter (24.4 %) of respondents thought that the illness was a chill, followed by bad blood, gland, magical powder, and sprain. Also, 14.9 % of respondents couldn't identify the illness. Surprisingly, only 2 people were able to recognize the illness as filariasis. A significant difference was observed both in gender (χ^2=16.83, df=7, p=0.02) and towns (χ^2=42.42, df=14, p<0.01). Those who answered bad blood were dominated by females, and more people in Cabaret thought it was gland rather than blood.

Table 6 describes the first symptom noticed. Swollen foot, swollen gland, and pain were common symptoms reported. There was a significant regional difference (χ^2=55.61, df=12, p<0.01). More people in La Plaine experienced fever, headache, and hot foot than those in other towns. However, no significant gender differences were found.

Table 7 shows how people treated the illness at that time. Nearly half of them relied on traditional medication such as an herbal remedy. Also, Western medicine was

an alternative choice (95 or 30.1 % of them visited a hospital/clinic or health center and 83 or 26.3 % went to the pharmacies). Although no significant gender differences were found in their help-seeking behavior (χ^2=13.35, df=7, p=0.06), females were more likely to follow traditional medicine. Regional differences were also evident (χ^2=67.55, df=14, p<0.01). People living in Arcahaie preferred traditional healers, but those in La Plaine were dependent more on health professionals as well as herbal remedies and use of cupping/leeches.

Table 8 describes what precautions people usually take with their affected legs. Keeping clean/hygiene, wash/soak/soap legs, herbal remedy, and wearing sandals/socks/stockings/shoes were the most common precautions taken. However, some of those who answered "other" practiced contradictory precautions such as exposing legs to cold water or washing legs with cold water or urine, instead of avoiding cold water or washing legs with hot water. There was no significant gender difference in precautions taken, but regional differences were significant (χ^2=50.74, df=20, p<0.01). People in Arcahaie preferred to use herbal remedies, pomade, and leg covering such as sandals and stockings. Avoiding cold water and something cold or wet was a more common precaution in Cabaret. On the other hand, those in La Plaine tried to band, wrap, tie legs, not to walk on ground with bare feet, and to keep clean by washing legs more than residents of other areas.

Table 5. The First Impression of the Illness (multiple responses, *:1 missing, **: different between gender ($p<0.05$), ***: different among towns ($p<0.05$)).

		Total (N=316)	Gender		Town*		
			Male (N=61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
Age of first awareness of the illness (mean ± SD (range))		28.0 ± 15.6 (1 – 95)	27.1 ± 18.4 (1 – 95)	28.2 ± 14.8 (1 – 78)	27.3 ±14.6 (4 – 72)	27.1 ± 15.3 (3 – 72)	29.4 ± 16.8 (1 – 95)
First impression of the illness (n (% N)) ** ***	Chill	77 (24.4)	16 (26.2)	61 (23.9)	32 (26.7)	15 (20.8)	30 (24.4)
	Gland	62 (19.6)	15 (24.6)	47 (18.4)	13 (10.8)	23 (31.9)	26 (21.1)
	Magical powder	56 (17.7)	13 (21.3)	43 (16.9)	32 (26.7)	4 (5.6)	20 (16.3)
	Sprain	54 (17.1)	12 (19.7)	42 (16.5)	18 (15.0)	13 (18.1)	23 (18.7)
	Filariasis	2 (0.6)	1 (1.6)	1 (0.4)	0 (0)	1 (1.4)	1 (0.8)
	Don't know	47 (14.9)	7 (11.5)	40 (15.7)	17 (14.2)	15 (20.8)	14 (11.4)
	Blood	70 (22.2)	2 (3.3)	68 (26.7)	27 (22.5)	4 (5.6)	39 (31.7)
	Other	53 (16.8)	8 (13.1)	45 (17.7)	21 (17.5)	10 (13.9)	22 (17.9)

Table 6. The First Symptom Noticed (n (% N), multiple responses, *:1 missing, **: different among towns ($p<0.05$)).

	Total (N=316)	Gender		Town* **		
		Male (N=61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
Swollen foot	266 (84.2)	53 (86.9)	213 (83.5)	100 (83.3)	55 (76.4)	110 (89.4)
Pain	179 (56.7)	31 (50.8)	147 (57.6)	65 (54.2)	33 (45.8)	80 (65.0)
Swollen gland	190 (60.1)	43 (70.5)	147 (57.6)	51 (42.5)	49 (68.1)	89 (72.4)
Fever	141 (44.7)	29 (47.5)	112 (43.9)	39 (32.5)	23 (31.9)	78 (63.4)
Headache	47 (14.9)	8 (13.1)	39 (15.3)	5 (4.2)	5 (7.0)	37 (30.1)
Hot foot	115 (36.4)	18 (29.5)	97 (38.0)	30 (25.0)	14 (19.4)	71 (57.7)
Other	70 (22.2)	12 (19.7)	58 (22.7)	36 (30.0)	14 (19.4)	20 (16.3)

Table 7. Treatment Choice (n (% N), multiple responses, *:1 missing, **: different among towns (p<0.05)).

	Total (N=316)	Gender		Town* **		
		Male (N=61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
Traditional healer	33 (10.4)	7 (11.5)	26 (10.2)	22 (18.3)	3 (4.2)	8 (6.5)
Herbal remedy	143 (45.3)	22 (36.1)	121 (47.5)	54 (45.0)	22 (30.6)	67 (54.5)
Pomade	49 (15.5)	11 (18.0)	38 (14.9)	23 (19.2)	10 (13.9)	16 (13.0)
Herbal leaves on legs	31 (9.8)	3 (4.9)	28 (11.0)	16 (13.3)	9 (12.5)	6 (4.9)
Cupping / leeches	51 (16.1)	7 (11.5)	44 (17.3)	11 (9.2)	2 (2.8)	38 (30.9)
Pharmaceutical medicine	83 (26.3)	21 (34.4)	62 (24.3)	31 (25.8)	24 (33.3)	28 (22.8)
Health professional	95 (30.1)	18 (29.5)	77 (30.2)	18 (15.0)	20 (27.8)	57 (46.3)
Other	49 (15.5)	2 (3.3)	47 (18.4)	15 (12.5)	14 (19.4)	19 (15.4)

Table 8. Precaution for Legs (n (% N), multiple responses, *:1 missing, **: different among towns (p<0.05)).

	Total (N=316)	Gender		Town* **		
		Male (N=61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
Avoid cold water/something cold/being wet	34 (10.8)	5 (8.2)	29 (11.4)	9 (7.5)	14 (19.4)	11 (8.9)
Band/bandage, wrap, tie legs	25 (7.9)	1 (1.6)	24 (9.4)	6 (5.0)	3 (4.2)	16 (13.0)
Do not walk (put legs) on ground (mud)	33 (10.4)	5 (8.2)	28 (11.0)	8 (6.7)	3 (4.2)	22 (17.9)
Keep clean/hygiene, wash/soak/soap legs	58 (18.4)	9 (14.8)	49 (19.2)	19 (15.8)	7 (9.7)	32 (26.0)
Herbal remedy (leaves/herbs)	56 (17.7)	11 (18.0)	45 (17.6)	28 (23.3)	9 (12.5)	19 (15.4)
Take medicine (komprime/flanax/dolex, etc,)	22 (7.0)	4 (6.6)	18 (7.1)	8 (6.7)	8 (11.1)	6 (4.9)
Put pomade	47 (14.9)	10 (16.4)	37 (14.5)	23 (19.2)	13 (18.1)	11 (8.9)
Raise legs	20 (6.3)	4 (6.6)	16 (6.3)	6 (5.0)	3 (4.2)	11 (8.9)
Put sandal/socks/stocking/shoes	58 (18.4)	14 (23.0)	44 (17.3)	30 (25.0)	13 (18.1)	15 (12.2)
Nothing	68 (21.5)	12 (19.7)	56 (22.0)	28 (23.3)	16 (22.2)	23 (18.7)
Other	94 (29.7)	16 (26.2)	78 (30.6)	39 (32.5)	20 (27.8)	35 (28.5)

Table 9 shows the history of acute attacks in the previous year. To determine gender and regional differences, the following statistical tests were used as appropriate: T-test, F-test, and chi-square test. The criterion of significance is $\alpha = 0.05$. Most people (94.6 %) experienced at least one attack in the previous year. Each attack lasted 10.6 days on average. Females had a significantly longer attack period than males ($T=-2.59$, $df=298$, $p=0.01$). People sought treatment in nearly half of the attacks. Of those, more than one-third of people went to a clinic, and 12.6 % visited an herbalist. The other sites mostly consisted of health centers or pharmacies. Regional differences were significant ($\chi^2=16.87$, $df=8$, $p=0.03$). Particularly, people in Arcahaie preferred the herbalist, but those in Cabaret visited pharmacies more often. Approximately 5.1 days had elapsed between the onset of the illness and the visit to health facilities, and there was a significant gender difference ($T=2.99$ $df=213$, $p<0.01$); interestingly, females stayed at home longer, though they had a longer attack period. In each attack, people visited health care facilities about 2.5 times, averaging 7.7 hours for a trip and 25.2 Gde (US $0.59) for each transportation fee. About 30 % of respondents received help from others during the visit to health facilities, and most helpers were family members. Besides accompanying the patient to the clinic, helpers mainly took over patients' routine household chores and prepared and administered medicine, herbal remedies, and some other common treatments for lymphedema. The average cost of consultation per visit was 54.01 Gde (US $1.27), and for each attack the total average cost was 130.49 Gde (US $3.07). These fees include the cost of consultation only and exclude the cost of treatment. The consultation in Cabaret seemed to be less expensive.

About three-quarters (74.4 %) of people who went to health care facilities obtained medicine. Also, 25.6 % of them received herbal remedies or pomade. Most of the tests/exams were blood exams. The cost was dependent on the type of treatment. The treatment related to Western medicine (test/exam and shot/injection) was more expensive than other traditional procedures, except for herbal remedies. However, the average cost of treatment was inconsistent among its type, possibly due to the large number of missing responses. On the other hand, people selected herbal remedy more often than medicine when they made a treatment at home. More than two-thirds of people chose pharmacy medicines (*flanax*, *komprime*) or a common antibiotic (ampicillin). A significant difference was present both among gender (χ^2=16.48, df=7, p=0.02) and towns (χ^2=81.11, df=14, p<0.01). Particularly, females relied more on indigenous treatment such as herbal remedy or leg washing. Also, in comparison with people in Arcahaie and Cabaret, those in La Plaine were more concerned about the treatment for legs generally, especially washing legs, taking medicine, and raising legs.

In more than 40 % of attacks, people received some help from a third person during the illness. Mostly, family members or relatives took over respondents' daily housework and assisted in their treatment, including herbal remedies, soaping legs, and use of pomades. No gender difference was found in the type of help sought. In contrast, regional differences were noted (χ^2=13.32, df=2, p<0.01). Particularly, in comparison with the other cities, people in La Plaine sought more help in daily activities than the treatment for legs. Also, in 58 % of attacks, the respondents weren't able to engage in their work activities during the illness. The average number of missing days was 11.7

days, which indicates that they were unable to work during the entire period of the attack. There were neither significant gender nor regional differences.

Table 9. History of Acute Attacks (#: 1-3 missing, *: difference between gender (p<0.05), **: difference among towns (p<0.05), ***: The average cost of treatment obtained in health settings was calculated only for total due to a small number of the valid sample).

		Total (N = 316)	Gender		Town#		
			Male (N = 61)	Female (N = 255)	Arcahaie (N = 120)	Cabaret (N = 72)	La Plaine (N = 123)
People who had acute attacks during the past year (n (% N), T=total attacks)		299 (94.6) T = 462	58 (95.1) T = 93	241 (94.5) T = 369	113 (94.1) T = 187	69 (95.8) T = 106	116 (94.3) T = 166
Number of attacks (mean ± SD)		1.5 ± 0.8	1.6 ± 0.8	1.4 ± 0.8	1.5 ± 0.8	1.5 ± 0.8	1.3 ± 0.7
Duration of attack (mean days ± SD) *		10.6 ± 11.9	8.6 ± 6.3	11.1 ± 13.0	10.9 ± 10.5	9.2 ± 6.7	11.0 ± 15.6
Location of treatment sought (n (% T), multiple responses) **	Clinic	165 (35.7)	44 (47.3)	121 (32.8)	66 (35.3)	39 (36.8)	60 (36.1)
	Herbalist	58 (12.6)	11 (11.8)	47 (12.7)	30 (16.0)	11 (10.4)	17 (10.2)
	Voodoo priest	7 (1.5)	1 (1.1)	6 (1.6)	5 (2.7)	1 (0.9)	1 (0.6)
	Other site	47 (10.2)	11 (11.8)	36 (9.8)	15 (8.0)	19 (17.9)	13 (7.8)
	Nowhere	212 (45.9)	32 (34.4)	180 (48.8)	79 (42.2)	42 (39.6)	88 (53.0)
Days spent before Rx (mean ± SD) *		5.1 ± 8.1	3.2 ± 2.7	5.6 ± 9.1	5.6 ± 9.3	3.2 ± 4.2	5.7 ± 8.5
Reasons for days spent before treatment (n (% T), multiple responses)	No time	50 (10.8)	12 (12.9)	38 (10.3)	18 (9.6)	16 (15.1)	16 (9.6)
	No money	57 (12.3)	12 (12.9)	45 (12.2)	19 (10.2)	17 (16.0)	21 (12.6)
	Can't go out	31 (6.7)	10 (10.8)	21 (5.7)	15 (8.0)	1 (0.9)	15 (9.0)
	Treatment at home	23 (5.0)	2 (2.2)	21 (5.7)	8 (4.3)	5 (4.7)	10 (6.0)
	Other	44 (9.5)	7 (7.5)	37 (10.0)	14 (7.5)	11 (10.4)	16 (9.6)
	Missing, not applicable	278 (60.2)	24 (25.8)	133 (36.0)	122 (65.2)	60 (56.6)	96 (57.8)
Number of visits for the same attack (mean ± SD) **		2.5 ± 1.7	2.3 ± 1.7	2.6 ± 1.8	2.4 ± 1.5	2.1 ± 1.5	2.9 ± 2.2
Accompanied to health centers (n (% T))		146 (31.6)	37 (39.8)	109 (29.5)	70 (37.4)	32 (30.2)	44 (26.5)
Of those, by family / relative (n (% above))		122 (83.6)	32 (86.5)	90 (82.6)	58 (82.9)	27 (84.4)	37 (84.1)
Time to arrive at the place (hours ± SD)		7.7 ± 23.7	7.6 ± 10.5	7.7 ± 26.7	6.7 ± 10.1	9.6 ± 11.6	7.6 ± 39.5
Paid for transportation (n (% T))		132 (28.6)	33 (35.5)	99 (26.8)	59 (31.6)	32 (30.2)	41 (24.7)

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Table 9 (Continued).

		Total (T = 462)	Gender		Town#		
			Male (T = 93)	Female (T = 369)	Arcahaie (T = 187)	Cabaret (T = 106)	La Plaine (T = 166)
Sought care at health center (H (%))		250 (54.1)	61 (65.6)	189 (51.2)	108 (57.8)	64 (60.4)	78 (47.0)
Number of consultation visits per attack (mean ± SD)**		2.9 ± 4.9	3.2 ± 6.6	2.7 ± 4.1	2.0 ± 1.4	2.1 ± 3.4	4.6 ± 7.6
Cost per visit (mean Gde ± SD) **		54.0 ± 87.5	51.2 ± 72.7	55.0 ± 92.4	66.5 ± 99.2	25.7 ± 28.4	62.8 ±101.0
Cost for total (mean Gde ± SD)		130.5 ± 244.7	162.4±332.4	119.6±206.7	163.8±305.5	86.1±177.9	174.9±191.8
Treatment obtained in health setting (n (% H) * **, cost (gde) ± SD, multiple responses) ***	Shot / injection	55 (22.0), 163.6 ± 232.8	18 (29.5)	37 (19.6)	15 (13.9)	24 (37.5)	16 (20.5)
	Medicine	186 (74.4), 174.5 ± 271.1	44 (72.1)	142 (75.1)	82 (75.9)	42 (65.6)	62 (79.5)
	Herbal remedy	64 (25.6), 145.6 ± 208.4	11 (18.0)	53 (28.0)	33 (30.6)	11 (17.2)	20 (25.6)
	Cupping / leech	30 (12.0), 65.9 ± 85.7	2 (3.3)	28 (14.8)	10 (9.3)	0 (0)	20 (25.6)
	Pomade	64 (25.6), 76.2 ± 148.9	12 (19.7)	52 (27.5)	21 (19.4)	20 (31.3)	23 (29.5)
	Massage	14 (5.6), 52.5 ± 130.6	0 (0)	14 (7.4)	0 (0)	0 (0)	14 (17.9)
	Bandage	23 (9.2), 34.3 ± 39.8	0 (0)	23 (12.2)	1 (0.9)	0 (0)	22 (28.2)
	Test / exam	20 (8.0), 314.2 ± 434.8	3 (4.9)	17 (9.0)	5 (4.6)	1 (1.6)	14 (17.9)
	Other	11 (4.4), 380 ± 0	1 (1.6)	10 (5.3)	5 (4.6)	1 (1.6)	5 (6.4)
	Missing	34 (13.6),N/A	8 (13.1)	26 (13.8)	0 (0)	10 (15.6)	24 (30.8)

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Table 9 (Continued).

		Total (T = 462)	Gender		Town#		
			Male (T = 93)	Female (T = 369)	Arcahaie (T = 187)	Cabaret (T = 106)	La Plaine (T = 166)
Self-care at home (n (% T)) * **	Took medicine	125 (27.1)	27 (29.0)	98 (26.6)	37 (19.8)	12 (11.3)	76 (45.8)
	Herbal remedy	214 (46.3)	34 (36.6)	180 (48.8)	80 (42.8)	47 (44.3)	84 (50.6)
	Pomade	132 (28.6)	16 (17.2)	116 (31.4)	54 (28.9)	32 (30.2)	46 (27.7)
	Washed legs	183 (39.6)	33 (35.5)	150 (40.7)	52 (27.8)	27 (25.5)	101 (60.8)
	Raised legs	94 (20.3)	18 (19.4)	76 (20.6)	24 (12.8)	14 (13.2)	56 (33.7)
	Prayed	56 (12.1)	1 (1.1)	55 (14.9)	5 (2.7)	2 (1.9)	46 (27.7)
	None	20 (4.3)	4 (4.3)	16 (4.3)	6 (3.2)	10 (5.3)	4 (2.4)
	Other	63 (13.6)	6 (6.5)	57 (15.4)	25 (13.4)	10 (5.3)	28 (16.9)
	Missing	76 (16.5)	22 (23.7)	54 (14.6)	33 (17.6)	29 (27.4)	14 (8.4)
People received help (n (% T)) **		193 (41.8)	41 (44.1)	152 (41.2)	76 (40.6)	31 (29.2)	86 (51.8)
by family/relative (n (% above))		166 (86.0)	35 (85.4)	131 (86.2)	64 (84.2)	28 (90.3)	74 (86.0)
People who couldn't work during the attack (n (% T))		270 (58.4)	59 (63.4)	211 (57.2)	105 (56.1)	71 (67.0)	91 (54.8)
Days missing work (mean ± SD) **		11.7 ± 22.7	10.0 ± 25.2	12.2 ± 21.8	9.3 ± 9.5	6.4 ± 5.7	19.6 ± 37.8

Table 10 shows respondents' treatment for legs in the previous attack. About 50 % of the respondents purchased goods for their treatment and prevention. Forty percent of those who purchased goods obtained sandals, and 36.4 % applied pomades. T-test indicated that the cost of sandals was more than twice as expensive as that of pomades at the significance level of $\alpha = 0.05$ ($T=4.48$, $df=166$, $p<0.01$), but there was no significant difference in purchase history between gender. In contrast, regional preferences were apparent ($\chi^2=20.51$, $df=6$, $p<0.01$). Particularly, those in Cabaret preferred pomade over use of a bandage.

Table 11 describes people's daily activities. Among five different categories, more than half of them engaged in washing clothes, going shopping, and going to church. Including go selling, however, these activities were exclusively women's roles ($\chi^2>7.4$, $df=1$, $p<0.01$, and $RR>2.2$). Unlike gender differences, regional differences were less obvious. Only the numbers of people going shopping and selling were significantly higher in Arcahaie than in the other towns. The average days of the activities were also calculated. Going selling occurred much more often than other activities. This is probably related to source of income.

Table 10. Materials Purchased (n (% N), multiple answers, #: 1 missing, *: different among gender (p<0.05)).

	Total (N = 316)	Gender		Town#			Cost (gde ± SD (range))
		Male (N = 61)	Female (N = 255)	Arcahaie (N = 120)	Cabaret (N = 72)	La Plaine (N = 123)	
People who bought	160 (50.6)	31 (50.8)	129 (50.6)	66 (55.0)	40 (55.6)	54 (43.9)	123.2 ± 131.7 (0 – 1000)*
Shoes/sandals	90	16	74	44	10	36	159.5 ± 119.9 (0 – 500)*
Pomade	82	18	64	32	24	26	68.5 ± 66.3 (0 - 350)
Bandage	23	5	18	8	1	14	68.8 ± 52.0 (0 – 175)
Other	30	7	23	9	11	10	205.7 ± 274.9 (0 – 1000)*

Table 11. Daily Activities (n (% N), mean days per week ± SD), *: frequency different between gender (p<0.05), **: frequency different among towns (p<0.05), #: days different between gender (p<0.05), ##: days different among towns (p<0.05), &: 1 missing).

	Total (N=316)	Gender		Town &		
		Male (N=61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
Wash clothes * **	209 (66.3) 2.3 ± 1.4	10 (16.4) 2.4 ± 1.1	199 (78.4) 2.3 ± 1.4	72 (60.0) 2.2 ± 1.1	41 (57.8) 2.0 ± 0.9	95 (77.2) 2.6 ± 1.8
Go shopping * ##	162 (51.4) 2.5 ± 1.7	11 (18.0) 3.5 ± 2.7	151 (59.5) 2.4 ± 1.6	72 (60.0) 2.1 ± 1.0	31 (43.7) 2.3 ± 1.0	59 (48.0) 3.0 ± 2.3
Go selling * ** # ##	61 (19.5) 3.5 ± 2.2	2 (3.3) 2.0 ± 0	59 (23.4) 3.5 ± 2.1	32 (26.9) 2.2 ± 1.1	14 (19.7) 4.1 ± 2.0	15 (12.3) 5.4 ± 2.0
Go to church * #	178 (56.5) 1.9 ± 1.6	25 (41.0) 1.4 ± 0.7	153 (60.2) 2.0 ± 1.7	68 (56.7) 1.8 ± 1.4	38 (53.5) 1.7 ± 1.2	71 (57.7) 2.1 ± 1.9
Take children to school **	68 (21.9) 1.9 ± 1.0	9 (14.8) 1.7 ± 0.7	59 (23.7) 1.9 ± 1.1	13 (10.9) 1.8 ± 0.9	15 (21.1) 2.1 ± 1.3	40 (33.6) 1.9 ± 1.0

Knowledge

Table 12 describes respondents' knowledge of the cause of the illness. More than half of them did not know a cause. Only 9.8 % of them could identify that the illness was due to an insect bite or worms. Twenty-one people thought that the illness was related to blood. Under the chi-square test, there was no gender difference in knowledge; however, regional differences were evident (χ^2=31.52, df=10, p<0.01). People living in Arcahaie reported more knowledge about the cause of the illness.

Table 12. Cause of Illness (n (% N), multiple responses, *: 1 missing, **: different among towns (p<0.05)).

	Total (N=316)	Gender		Town* **		
		Male (N=61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
Insect bite or worms	31 (9.8)	5 (8.2)	26 (10.2)	16 (13.3)	5 (6.9)	10 (8.1)
Magic	33 (10.4)	8 (13.1)	25 (9.8)	23 (19.2)	3 (4.2)	7 (5.7)
Sprain or foot injury	30 (9.5)	4 (6.6)	26 (10.2)	12 (10.0)	9 (12.5)	9 (7.3)
Chill	43 (13.6)	13 (21.3)	30 (11.8)	22 (18.3)	8 (11.1)	13 (10.6)
Other	41 (13.0)	6 (9.8)	35 (13.7)	22 (18.3)	9 (12.5)	10 (8.1)
Do not know	177 (56.0)	31 (50.8)	146 (57.3)	50 (41.7)	43 (59.7)	83 (67.5)

Foot Size and Illness Stage

To observe the lymphedema condition and determine the relationship between this condition and the variables of interest, T-test and F-test were used for foot size, and the chi-square test was conducted for illness stage. The level of significance is $\alpha = 0.05$ for all tests.

Table 13 presents the results of a foot exam. The mean foot size was 24.6 cm for right and 24.8 cm for left. The ankle size was 26.2 cm for right and 27.0 cm for left. The size of the leg was 35.5 cm for right and 35.9 cm for left. Due to the nature of physical appearances, t-test revealed that there were significant differences in foot and leg sizes between genders (all p-values < 0.01); however, interestingly, the sizes of legs, which measured 20 cm above the ground, were significantly larger among females than males. There were no significant differences in ankles by gender. Also, there were no significant differences among towns, except left foot was larger in La Plaine ($F=3.65$, $df=2, 309$, $p=0.03$).

Table 14 and Figure 3 show the distribution of illness by stage. More than two-third of people's legs were categorized as stage 2 or lower, except for the left foot among those living in La Plaine. Some patients had lymphedema on one side only. No gender differences were observed for illness stage in both legs, but those who live in La Plaine experienced more severe symptoms of lymphedema, particularly of the left leg ($\chi^2=13.95$, $df=2$, $p<0.01$).

Stages and sizes of feet are also summarized in Table 15 and Figure 4, by current age (age group), age of onset, education, income, occupation, knowledge of the illness, and the number of acute attacks in the previous year. Only the number and/or proportion of stage 2 or lower was described in stages of illness. Current age was correlated with illness stage and leg size. In each foot location, the mean foot size increased with age (all p-values < 0.05). In particular, people in their 50s experienced more severe symptoms than younger cohorts. Also, the stage of the illness varied among the age groups but was more likely to be mild in younger groups. On the other hand, the other variables were less related to either stage or foot size. Significant variations were observed only for size of right ankle by education and knowledge of the illness, and the size of left leg by occupation. Therefore, other variables seem to be poorly associated with foot size and stage.

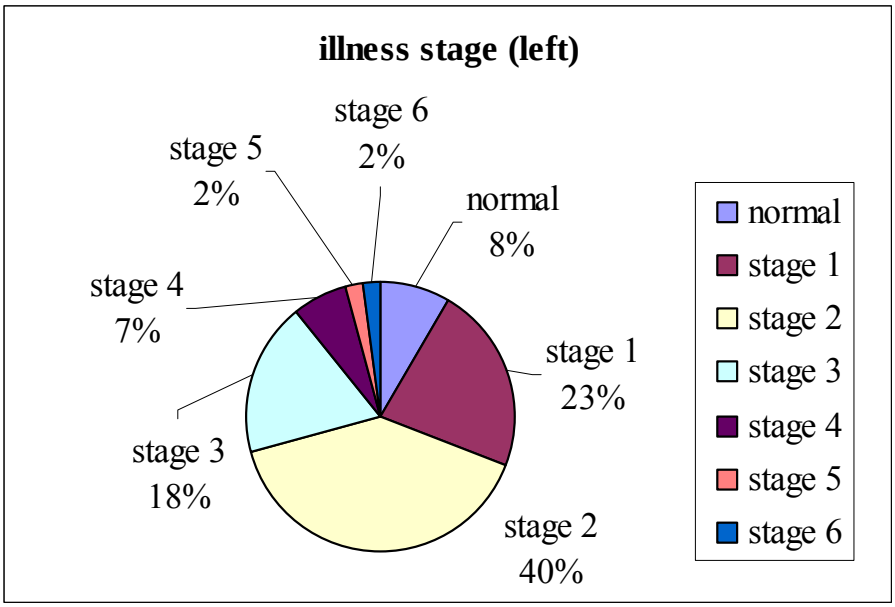
Table 13. Foot Exam (mean cm ± SD (range), *: different between gender (p < 0.05), **: different among towns (p < 0.05)).

	Total	Gender		Town		
		Male	Female	Arcahaie	Cabaret	La Plaine
Foot (right)*	24.6 ± 3.0 (19 - 42)	25.8 ± 3.5 (20 - 42)	24.4 ± 2.8 (19 - 40)	24.6 ± 3.4 (19.5 – 42)	24.2 ± 2.7 (20 – 35)	24.9 ± 2.7 (19 – 34)
(left) * **	24.8 ± 2.9 (18.5 - 38)	25.7 ± 2.6 (20 - 32)	24.6 ± 3.0 (18.5 - 38)	24.4 ± 3.0 (18.5 – 38)	24.6 ± 2.6 (20 – 32)	25.4 ± 3.0 (20 – 34)
Ankle (right)	26.2 ± 4.9 (18 - 49)	27.1 ± 6.3 (18 - 49)	26.0 ± 4.5 (18 - 45)	26.0 ± 4.2 (19 – 40)	25.7 ± 4.6 (18 – 44)	26.8 ± 5.6 (18 – 49)
(left)	27.0 ± 5.4 (17 - 57)	27.2 ± 5.2 (21 - 57)	27.0 ± 5.4 (17 - 51)	26.5 ± 4.7 (17 – 48)	27.1 ± 5.2 (18.5 – 48)	27.4 ± 6.1 (19 – 57)
Leg (right)	35.5 ± 5.6 (23 - 54)	34.1 ± 6.8 (23 - 54)	35.8 ± 5.3 (24 - 54)	35.4 ± 5.7 (23 – 49)	35.2 ± 5.5 (25.5 – 53)	35.8 ± 5.6 (24 – 54)
(left) *	35.8 ± 6.4 (22.5 - 80)	33.9 ± 5.1 (24.5 - 52)	36.3 ± 6.6 (22.5 - 80)	35.1 ± 6.0 (22.5 – 57)	36.1 ± 7.3 (25.5 – 80)	36.5 ± 6.2 (25 – 62)

Table 14. Stage of Illness (n (% N), *: different among towns (p<0.05)).

Stage (left)	Total (N = 314)	Gender		Towns *		
		Male (N = 59)	Female (N = 255)	Arcahaie (N = 119)	Cabaret (N = 71)	La Plaine (N = 123)
0 - Normal	26 (8.3)	4 (6.8)	22 (8.6)	7 (5.9)	2 (2.8)	17 (13.8)
1 - Swelling is reversible overnight	71 (22.6)	10 (16.9)	61 (23.9)	28 (23.5)	20 (28.2)	23 (18.7)
2 - Swelling is not reversible overnight	125 (39.8)	32 (54.2)	93 (36.5)	61 (51.3)	31 (43.7)	33 (26.8)
3 - Shallow skin fold	58 (18.5)	8 (13.6)	50 (19.6)	17 (14.3)	15 (21.1)	25 (20.3)
4 - Knobs	21 (6.7)	2 (3.4)	19 (7.5)	3 (2.5)	1 (1.4)	17 (13.8)
5 - Deep skin folds	6 (1.9)	1 (1.7)	5 (2.0)	0 (0.0)	2 (2.8)	4 (3.3)
6 - Mossy lesions	7 (2.2)	2 (3.4)	5 (2.0)	3 (2.5)	0 (0.0)	4 (3.3)
Stage 2 or lower	222 (70.7)	46 (67.9)	176 (69.0)	96 (80.7)	53 (74.7)	73 (59.3)
Stage (right)	Total (N = 314)	Gender		Towns		
		Male (N = 60)	Female (N = 254)	Arcahaie (N = 120)	Cabaret (N = 70)	La Plaine (N = 123)
0 - Normal	43 (13.7)	8 (13.3)	35 (13.8)	14 (11.7)	4 (5.7)	24 (19.5)
1 - Swelling is reversible overnight	106 (33.8)	25 (41.7)	81 (31.9)	46 (38.3)	28 (40.0)	32 (26.0)
2 - Swelling is not reversible overnight	84 (26.8)	14 (23.3)	70 (27.6)	33 (27.5)	24 (34.3)	27 (22.0)
3 - Shallow skin fold	52 (16.6)	5 (8.3)	47 (18.5)	18 (15.0)	11 (15.7)	23 (18.7)
4 - Knobs	21 (6.7)	3 (5.0)	18 (7.1)	8 (6.7)	1 (1.4)	12 (9.8)
5 - Deep skin folds	7 (2.2)	4 (6.7)	3 (1.2)	1 (0.8)	2 (2.9)	4 (3.3)
6 - Mossy lesions	1 (0.3)	1 (1.7)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.8)
Stage 2 or lower	233 (74.3)	47 (78.3)	186 (73.3)	83 (77.5)	56 (80.0)	83 (67.5)

Figure 3. Stage of Illness.



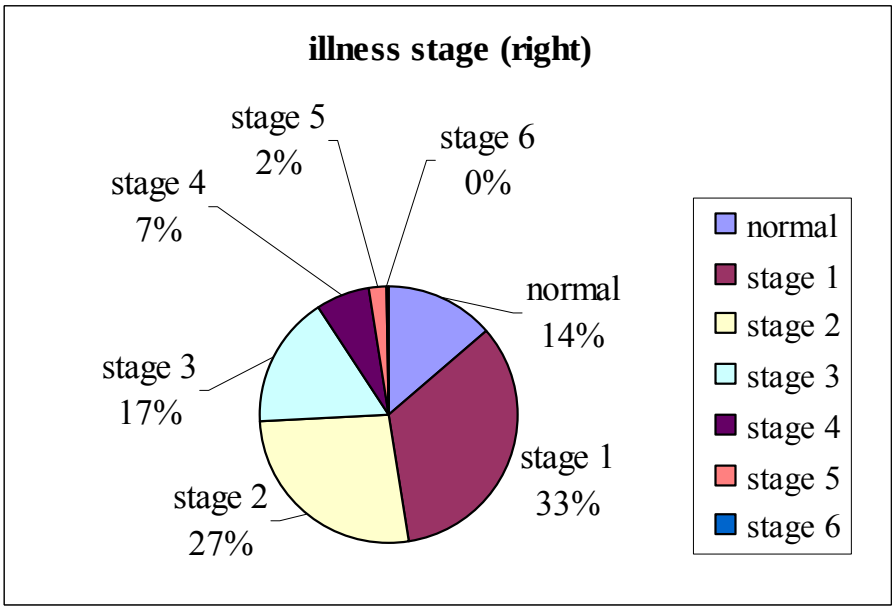


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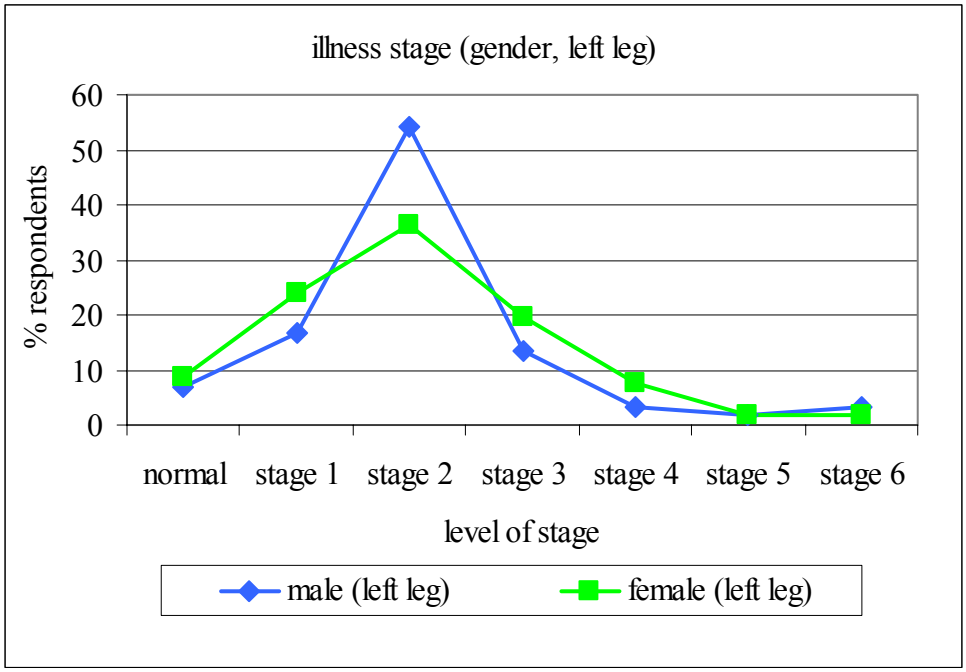
Figure 3 (Continued).



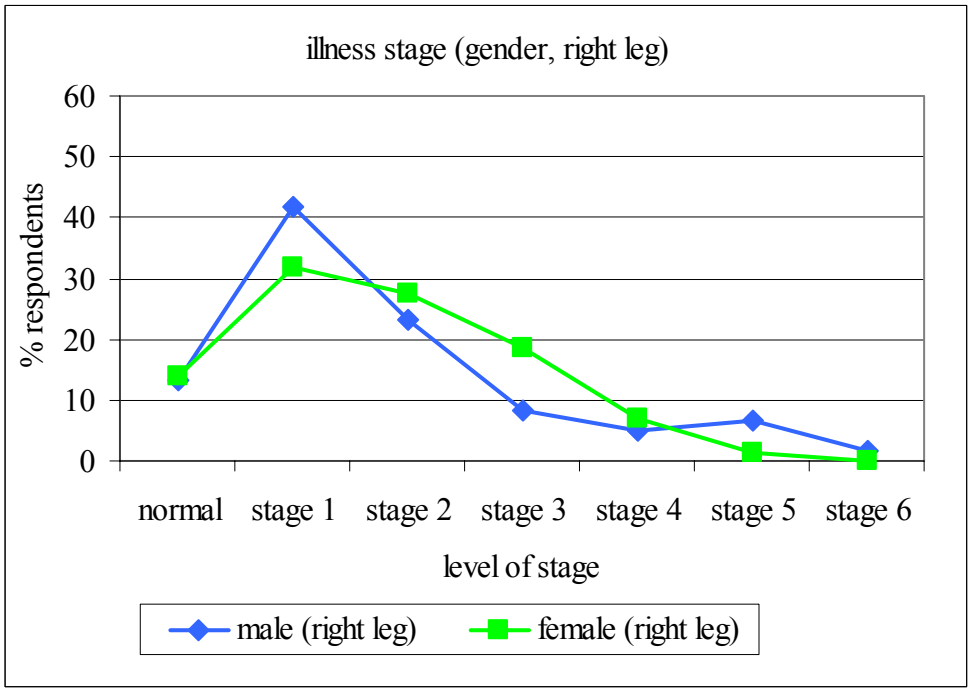


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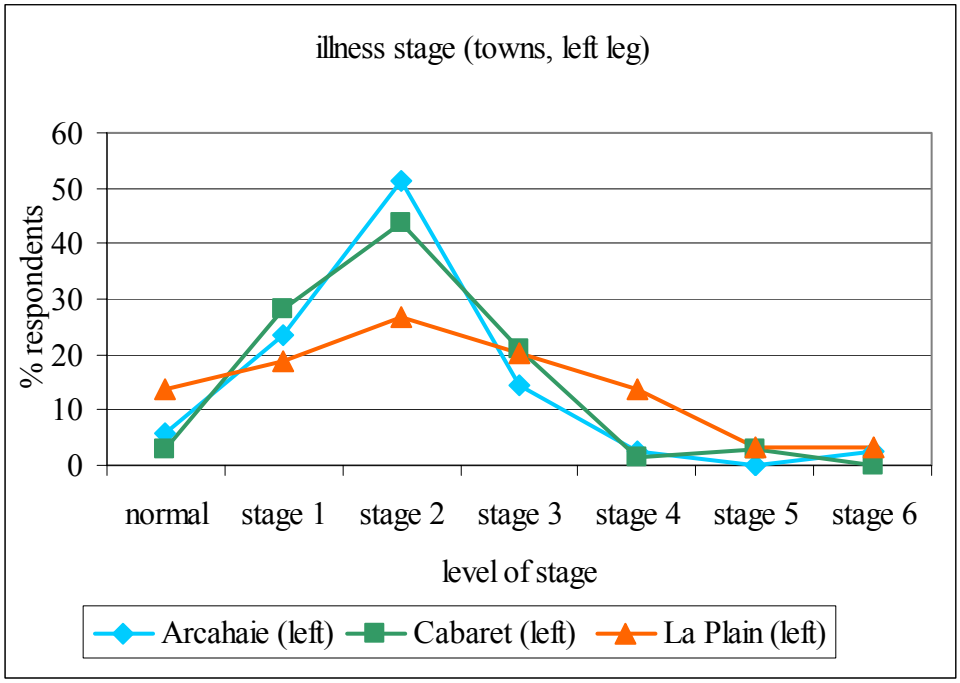
Figure 3 (Continued).



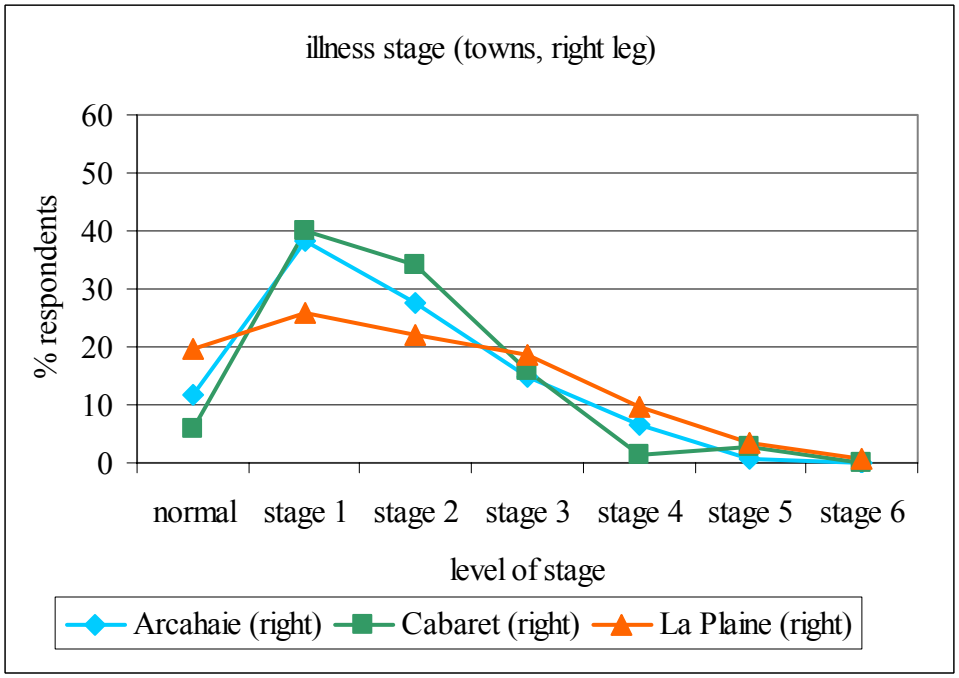


Table 15. Other Socio-demographic Variables vs. Stage of Illness (n (% N)) and Foot Sizes (mean cm ± SD) (*[1]: different total between left and right legs (N left / N right) due to the one side of leg missing among patients, *[2]: different among age group ($p<0.05$), *[3]: different among occupation (left only, $p<0.05$), *[4]: different among educational level (left only for stage, right only for ankle $p<0.05$), *[5]: different among knowledge of the illness (left only, $p<0.05$)).

	N	Stage 2 or lower *[2]		Foot *[2]		Ankle *[2]		Leg *[2]	
		Left	Right	Left	Right	Left	Right	Left	Right
Age group (yrs)									
19 or less	33	29 (87.9)	30 (90.9)	22.9 ± 1.9	23.2 ± 1.8	23.6 ± 2.9	23.0 ± 2.6	31.5 ± 3.7	31.5 ± 3.6
20 – 29	42	37 (88.1)	36 (85.7)	23.9 ± 2.1	23.7 ± 2.2	25.0 ± 3.9	24.6 ± 3.4	35.0 ± 4.4	34.8 ± 4.2
30 – 39	49	35 (71.4)	39 (79.6)	25.5 ± 2.9	24.8 ± 3.1	27.8 ± 5.8	26.2 ± 3.6	36.8 ± 5.6	35.7 ± 4.4
40 – 49	63	44 (69.8)	45 (71.4)	25.0 ± 2.5	24.8 ± 2.9	27.5 ± 5.6	27.1 ± 5.7	37.2 ± 7.4	36.7 ± 6.1
50 – 59	52	32 (61.5)	33 (63.5)	25.5 ± 3.6	26.1 ± 3.8	28.3 ± 5.6	28.2 ± 5.2	37.5 ± 6.6	37.9 ± 6.0
60 – 69	39	25 (64.1)	27 (69.2)	25.1 ± 3.0	24.2 ± 2.5	27.5 ± 4.3	26.2 ± 5.8	35.9 ± 6.9	35.1 ± 6.5
70 or more	33	17 (51.5)	21 (63.6)	25.3 ± 3.4	24.9 ± 2.8	28.4 ± 6.6	27.1 ± 4.7	35.0 ± 7.2	34.1 ± 5.3
Missing	3	3 (100.0)	2 (66.7)	23.3 ± 1.2	24.0 ± 1.0	22.0 ± 2.0	25.0 ± 2.6	32.3 ± 1.5	34.0 ± 4.4
Age of onset (yrs)									
9 or less	15	9 (60.0)	12 (80.0)	24.6 ± 3.3	23.9 ± 2.6	27.0 ± 6.5	24.7 ± 4.6	35.0 ± 6.7	34.1 ± 6.0
10 – 19	92	64 (69.6)	68 (73.9)	24.7 ± 2.7	24.7 ± 3.3	26.8 ± 5.8	26.2 ± 5.2	35.4 ± 5.8	35.0 ± 5.5
20 – 29	57	44 (77.2)	41 (71.9)	24.6 ± 2.9	24.2 ± 2.6	26.9 ± 5.3	26.2 ± 5.6	36.0 ± 6.8	36.0 ± 6.0
30 – 39	51	38 (74.5)	38 (74.5)	25.5 ± 3.2	25.7 ± 3.6	27.5 ± 3.2	27.0 ± 4.3	36.5 ± 4.9	36.7 ± 4.9
40 – 49	33	25 (75.8)	28 (84.9)	25.0 ± 3.6	24.0 ± 2.2	26.2 ± 5.3	25.5 ± 4.0	35.5 ± 6.3	34.7 ± 5.2
50 or more	29	23 (79.3)	21 (72.4)	24.2 ± 2.8	24.4 ± 1.8	25.8 ± 5.4	25.4 ± 3.2	35.0 ± 6.0	34.7 ± 5.1
Missing	37	19 (51.4)	25 (67.6)	24.9 ± 2.7	24.7 ± 3.1	28.6 ± 6.3	27.3 ± 5.6	37.3 ± 9.1	35.8 ± 6.4

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Table 15 (Continued).

	N	Stage 2 or lower *4		Foot		Ankle *4 *5		Leg *3	
		Left	Right	Left	Right	Left	Right	Left	Right
Daily income (gde)									
25 or less	33	25 (75.7)	23 (69.7)	24.6 ± 2.4	24.8 ± 4.1	26.5 ± 5.1	25.9 ± 4.4	34.7 ± 5.9	34.2 ± 4.8
26 – 50	28	18 (64.3)	21 (75.0)	25.1 ± 2.5	25.6 ± 3.9	27.7 ± 4.4	27.4 ± 5.3	36.9 ± 5.9	36.6 ± 6.2
51 – 100	29 / 28	22 (75.9)	21 (75.0)	25.1 ± 3.8	24.6 ± 2.5	27.5 ± 5.4	27.1 ± 5.5	36.1 ± 6.4	36.2 ± 5.0
101 – 200	25	13 (52.0)	18 (72.0)	26.2 ± 2.9	25.3 ± 3.0	27.5 ± 3.3	27.7 ± 6.1	36.3 ± 4.9	36.8 ± 5.4
201 – 400	29	18 (62.1)	19 (65.5)	25.4 ± 3.3	25.0 ± 2.2	28.9 ± 9.0	26.7 ± 4.6	37.6 ± 7.6	36.7 ± 6.0
401 or more	28	19 (67.9)	20 (71.4)	25.3 ± 2.6	24.8 ± 2.5	27.2 ± 3.7	26.1 ± 4.0	36.7 ± 4.8	36.8 ± 5.0
Missing/refused *1	142/143	107 (75.4)	111 (77.6)	24.3 ± 2.8	24.2 ± 2.8	26.3 ± 5.2	25.6 ± 4.7	35.3 ± 6.9	34.7 ± 5.7
Occupation									
Farmer	44	34 (77.3)	38 (86.4)	25.3 ± 2.4	25.3 ± 3.7	26.7 ± 5.2	26.8 ± 6.0	34.3 ± 5.8	34.5 ± 6.3
Seller at home *1	66 / 65	40 (60.6)	45 (69.2)	24.8 ± 2.7	24.7 ± 2.7	26.8 ± 3.5	26.4 ± 4.0	36.0 ± 5.2	36.4 ± 5.2
Seller at market	52	35 (67.3)	37 (71.2)	25.6 ± 3.4	25.2 ± 3.5	28.3 ± 6.7	27.0 ± 4.3	37.7 ± 7.1	37.1 ± 5.4
Tailor / seamstress	17	12 (70.6)	11 (64.7)	25.1 ± 3.2	24.1 ± 2.0	27.9 ± 5.3	25.9 ± 3.7	38.9 ± 7.0	35.8 ± 4.5
Other	64	51 (79.7)	54 (84.4)	24.5 ± 3.0	24.2 ± 2.6	26.6 ± 5.6	25.7 ± 5.4	35.2 ± 5.7	35.0 ± 5.6
Unemployed *1	88 / 89	63 (71.6)	62 (69.7)	24.3 ± 2.7	24.2 ± 2.6	26.4 ± 5.2	25.8 ± 5.3	35.2 ± 6.9	34.7 ± 5.9
Education (yrs)									
2 or less (preparatory)	155	102 (65.8)	111 (71.6)	25.2 ± 3.1	24.8 ± 3.0	27.4 ± 5.2	26.7 ± 5.3	35.8 ± 7.0	35.4 ± 6.0
3 - 4 (elementary)	33	23 (69.7)	23 (69.7)	24.5 ± 3.4	25.1 ± 3.7	27.2 ± 6.1	27.7 ± 6.3	36.5 ± 7.1	37.3 ± 7.0
5 - 6 (intermediate)	40	25 (62.5)	33 (82.5)	24.7 ± 2.8	23.9 ± 1.7	27.7 ± 7.0	24.8 ± 2.9	36.0 ± 7.5	35.1 ± 5.8
7 - 10 (secondary)	40	31 (77.5)	30 (75.0)	24.5 ± 2.4	24.5 ± 2.7	25.7 ± 5.1	25.6 ± 4.2	35.2 ± 4.1	35.1 ± 3.8
11 or more (higher)	37	33 (89.2)	31 (83.8)	24.3 ± 2.8	24.3 ± 3.6	25.9 ± 3.8	24.7 ± 3.0	36.1 ± 4.8	34.9 ± 3.7
Missing/refused	9	8 (88.9)	5 (55.6)	24.2 ± 2.2	24.4 ± 2.8	26.6 ± 3.3	27.6 ± 4.0	34.9 ± 3.1	36.0 ± 3.6

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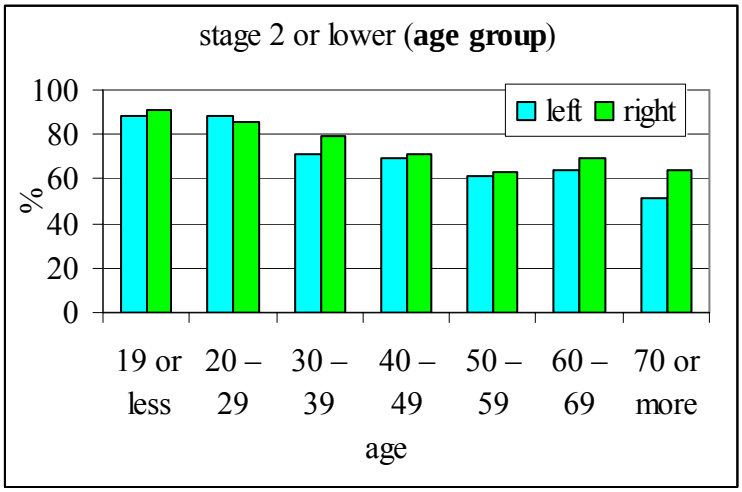
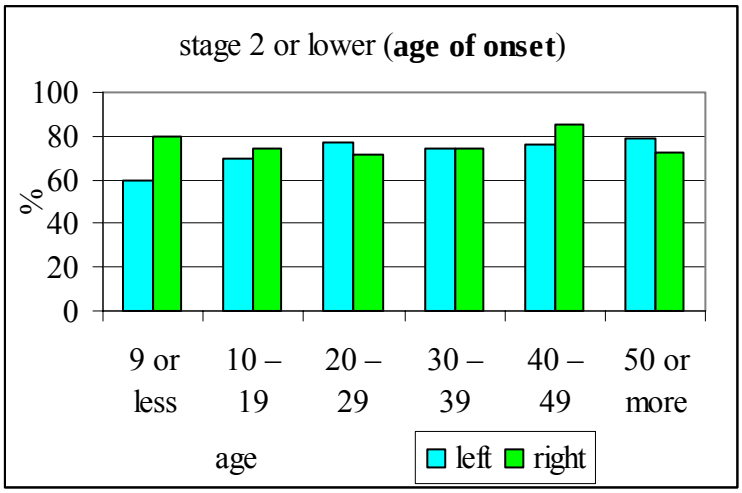
Table 15 (Continued).

	N	Stage 2 or lower		Foot		Ankle		Leg	
		Left	Right	Left	Right	Left	Right	Left	Right
Knowledge									
Insect bite / worm	31	25 (80.7)	23 (74.2)	24.5 ± 2.9	24.7 ± 2.4	26.0 ± 4.5	26.4 ± 4.6	37.3 ± 6.9	37.3 ± 5.9
Magic	33	23 (69.7)	24 (72.7)	25.2 ± 3.4	24.8 ± 4.0	28.0 ± 7.2	26.0 ± 4.3	35.0 ± 6.4	35.1 ± 5.0
Sprain foot / injury *[1]	30 / 29	23 (76.7)	22 (75.9)	24.9 ± 2.6	24.3 ± 2.8	27.9 ± 5.4	25.9 ± 4.0	36.0 ± 5.0	35.7 ± 4.4
Chill *[1]	41 / 42	29 (70.7)	31 (73.8)	25.0 ± 2.8	25.3 ± 3.4	27.9 ± 5.3	27.7 ± 5.6	35.8 ± 5.1	35.6 ± 5.8
Other	41	29 (70.7)	29 (70.7)	24.6 ± 2.4	25.3 ± 4.1	27.5 ± 3.8	28.0 ± 5.6	35.9 ± 5.0	36.9 ± 6.2
Don't know	177	123 (69.5)	133 (75.1)	24.7 ± 2.9	24.4 ± 3.4	26.5 ± 5.1	25.6 ± 4.4	35.5 ± 6.9	34.8 ± 5.2
Number of acute attacks									
0	16	13 (81.3)	11 (68.8)	23.8 ± 2.7	24.2 ± 2.0	25.3 ± 4.6	26.0 ± 3.2	35.1 ± 6.5	35.8 ± 5.3
1	177	123 (69.5)	137 (77.4)	24.8 ± 3.0	24.4 ± 2.6	27.2 ± 6.0	25.9 ± 5.0	36.2 ± 7.1	35.3 ± 5.5
2 *[1]	79 / 80	57 (72.2)	56 (70.0)	25.0 ± 2.8	25.0 ± 3.7	26.5 ± 4.0	26.5 ± 4.8	35.6 ± 5.2	35.6 ± 6.0
3	39	26 (66.7)	27 (69.2)	24.5 ± 2.8	24.8 ± 3.4	27.3 ± 4.6	27.3 ± 5.1	34.9 ± 5.5	35.7 ± 5.5

Figure 4. Stage of Illness by Socio-demographic Variables.





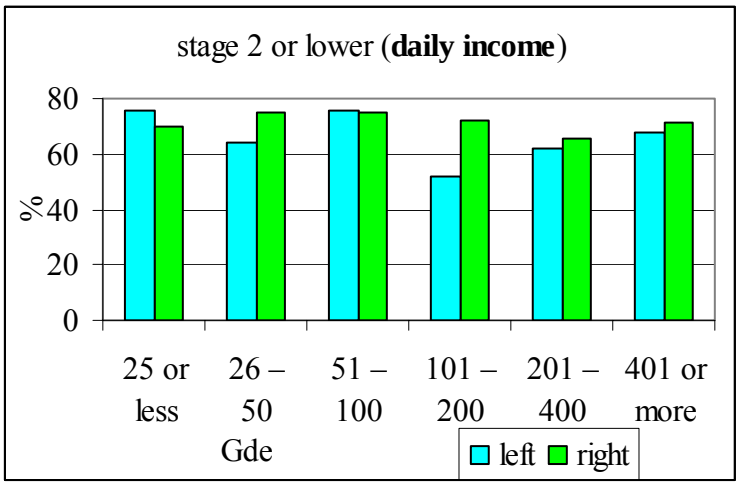


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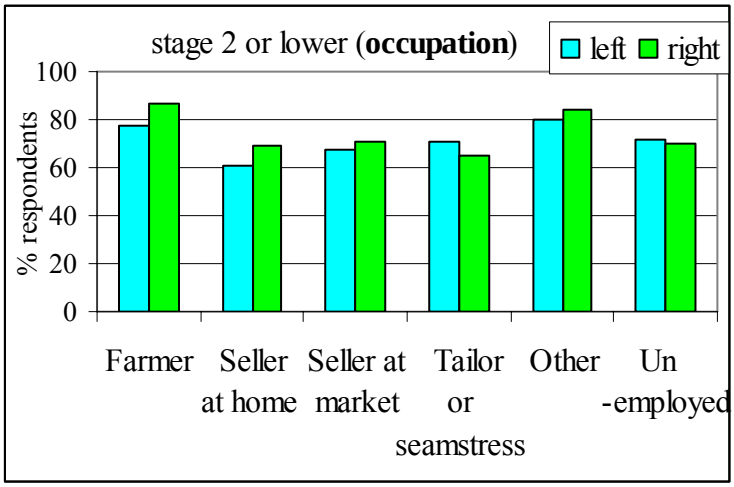
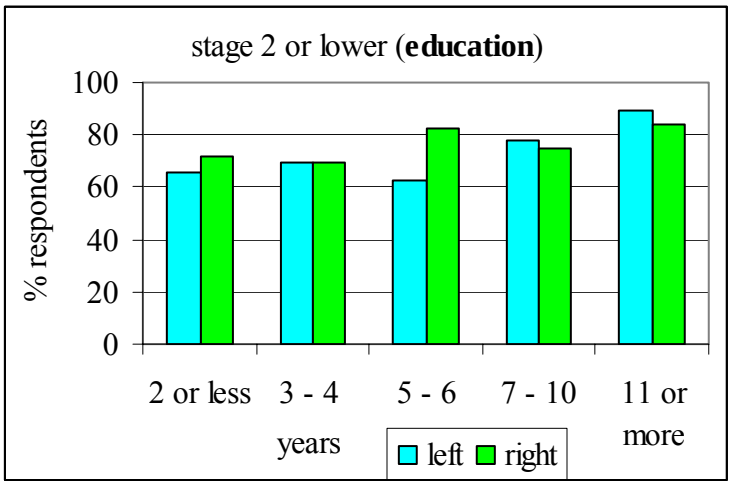
Figure 4 (Continued).





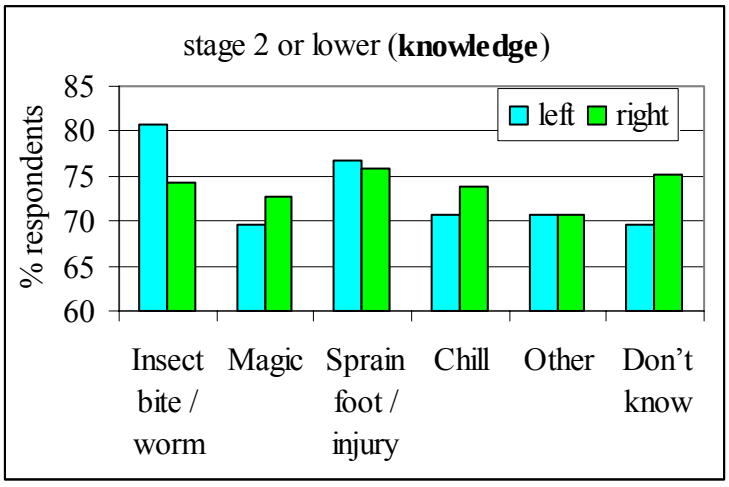


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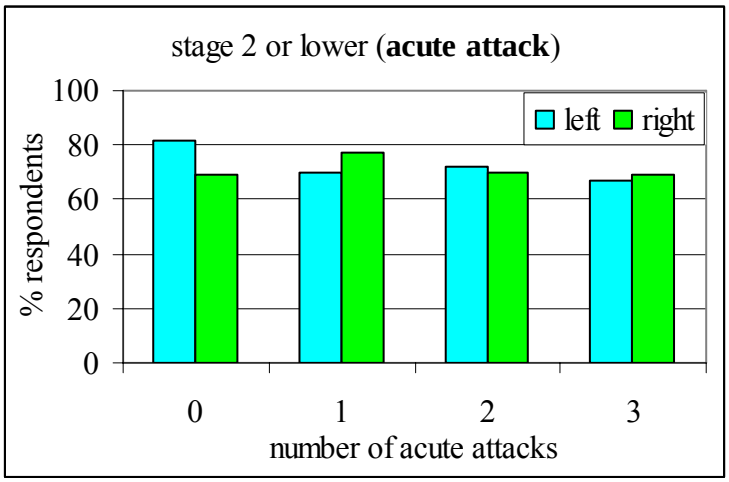
Figure 4 (Continued).



Self-care Practice and Self-efficacy

The data regarding self-care practices and self-efficacy were analyzed to describe respondents' health-related behaviors. Chi-square test was conducted to observe the differences of their behaviors by the variables of interest at a significant level of $\alpha = 0.05$.

Table 16 shows the number of people who currently practice self-care for affected legs. Hygiene**,** wearing shoes, and herbal remedy were among the most common self-care practices reported for legs. Of those, most people who answered hygiene and wearing shoes performed these practices as a daily care. On the other hand, the frequency of performing it was less often. Only about one-third of people who answered herbal remedy did it as a daily care. No gender differences were found, but regional differences were significant ($\chi^2=58.77$, df=22, $p<0.01$). People in La Plaine reported taking care of their legs more often than those in other regions.

Table 17 shows the self-care practices associated with other socio-demographic variables. The table includes the five most common practices (hygiene, wearing shoes, elevation, herbal remedy, and pomade) due to the small number of responses in the other practices. The remaining practices were categorized as "other". However, the choice of self-care practices was not significantly associated with the variables of interest (age group, age of onset, education, income, occupation, and knowledge of the illness).

Table 16. Gender, Town vs. Self-care Practice for Legs (n (% N), *: 1 missing, **: different among towns ($p<0.05$)).

	Total (N = 316)	Gender		Town* **		
		Male (N = 61)	Female (N = 255)	Arcahaie (N=120)	Cabaret (N = 72)	La Plaine (N=123)
Hygiene	202 (63.9)	36 (59.0)	169 (66.3)	68 (56.7)	44 (61.1)	92 (74.8)
Wearing shoes	238 (75.3)	41 (67.2)	197 (77.3)	77 (64.2)	54 (75.0)	106 (86.2)
Permanganate	41 (13.0)	8 (13.1)	33 (12.9)	10 (8.3)	5 (6.9)	26 (21.1)
Creme	49 (15.6)	4 (6.6)	45 (17.6)	16 (13.3)	5 (6.9)	27 (22.0)
Elevation	72 (22.8)	9 (14.8)	63 (24.7)	21 (17.5)	12 (16.7)	39 (31.7)
Massage	29 (9.2)	6 (9.8)	23 (9.0)	5 (4.2)	3 (4.2)	21 (17.1)
Exercise	21 (6.7)	6 (9.8)	15 (5.9)	8 (6.7)	5 (6.9)	8 (6.5)
Bandage	54 (17.1)	9 (14.8)	45 (17.6)	12 (10.0)	8 (11.1)	34 (27.6)
Medicine	59 (18.7)	16 (26.2)	43 (16.9)	26 (21.7)	11 (15.3)	22 (17.9)
Herbal remedy	139 (44.0)	23 (37.7)	116 (45.5)	57 (47.5)	35 (48.6)	47 (38.2)
Pomade	90 (28.5)	23 (37.7)	67 (26.3)	36 (30.0)	32 (44.4)	22 (17.9)
Other	32 (10.1)	6 (9.8)	26 (10.2)	8 (6.7)	10 (13.9)	14 (11.4)

Table 17. Other Socio-demographic Variables vs. Major Self-care Practices for Legs (n (% N), "other" indicates the sum of the rest of practices so that the number doesn't reflect the proportion of N).

	N	Hygiene	Wearing shoes	Elevation	Herbal remedy	Pomade	Other
Age group (yrs)							
19 or less	33	20 (73.4)	23 (69.7)	8 (24.2)	17 (51.5)	11 (33.3)	34
20 - 29	42	25 (59.5)	30 (71.4)	7 (16.7)	21 (50.0)	10 (23.8)	46
30 – 39	49	35 (71.4)	40 (81.6)	13 (26.5)	19 (38.8)	14 (28.6)	43
40 – 49	64	44 (68.8)	50 (78.1)	16 (25.0)	23 (35.9)	16 (25.0)	66
50 – 59	52	29 (55.8)	35 (67.3)	9 (17.3)	27 (51.9)	17 (32.7)	44
60 – 69	39	25 (64.1)	27 (69.2)	10 (25.6)	20 (51.3)	11 (28.2)	26
70 or more	34	25 (73.5)	30 (88.2)	9 (26.5)	12 (35.3)	9 (26.5)	25
Missing	3	2 (66.7)	3 (100.0)	0 (0)	0 (0)	2 (66.7)	1
Age of onset (yrs)							
9 or less	15	8 (53.3)	12 (80.0)	1 (6.7)	8 (53.3)	5 (33.3)	17
10 – 19	92	56 (60.9)	64 (69.6)	18 (19.6)	42 (45.7)	30 (32.6)	94
20 – 29	58	45 (77.6)	49 (84.5)	16 (27.6)	28 (48.3)	15 (25.9)	49
30 – 39	51	32 (62.7)	37 (72.5)	13 (25.5)	22 (43.1)	8 (15.7)	59
40 – 49	34	20 (58.8)	23 (67.6)	10 (29.4)	15 (44.1)	12 (35.3)	23
50 or more	29	17 (58.6)	20 (69.0)	5 (17.2)	11 (37.9)	9 (31.0)	19
Missing	37	27 (73.0)	33 (89.2)	9 (24.3)	13 (35.1)	11 (29.7)	30
Education (yrs)							
2 or less (preparatory)	157	101 (64.3)	118 (75.2)	32 (20.4)	65 (41.4)	41 (26.1)	110
3 – 4 (elementary)	33	19 (57.6)	19 (57.6)	5 (15.2)	18 (54.5)	9 (27.3)	27
5 – 6 (intermediate)	40	29 (72.5)	34 (85.0)	15 (37.5)	18 (45.0)	14 (35.0)	50
7 – 10 (secondary)	40	23 (57.5)	29 (72.5)	11 (27.5)	20 (50.0)	18 (45.0)	46
11 or more (higher)	37	28 (75.7)	31 (83.8)	9 (24.3)	15 (40.5)	5 (13.5)	41
Missing/refused	9	5 (55.6)	7 (77.8)	0 (0)	3 (33.3)	3 (33.3)	11

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Table 17 (Continued).

	N	Hygiene	Wearing shoes	Elevation	Herbal remedy	Pomade	Other
Daily income (gde)							
25 or less	33	27 (81.8)	28 (84.8)	12 (36.4)	14 (42.4)	9 (27.3)	30
26 – 50	28	18 (64.3)	22 (78.6)	6 (21.4)	10 (35.7)	10 (35.7)	21
51 – 100	29	20 (69.0)	22 (75.9)	7 (24.1)	10 (34.5)	5 (17.2)	23
101 – 200	25	11 (44.0)	19 (76.0)	2 (8.0)	12 (48.0)	7 (28.0)	12
201 – 400	29	13 (44.8)	16 (55.2)	6 (20.7)	15 (51.7)	9 (31.0)	34
401 or more	28	14 (50.0)	18 (64.3)	6 (21.4)	10 (35.7)	9 (32.1)	27
Missing/refused	144	102 (70.8)	113 (78.5)	33 (22.9)	68 (47.2)	41 (28.5)	138
Occupation							
Farmer	44	31 (70.5)	34 (77.3)	7 (15.9)	18 (40.9)	18 (40.9)	34
Seller at home	66	44 (66.7)	52 (78.8)	20 (30.3)	31 (47.0)	14 (21.2)	55
Seller at market	52	31 (59.6)	38 (73.1)	9 (17.3)	24 (46.2)	19 (36.5)	37
Tailor / seamstress	17	12 (70.6)	15 (82.4)	6 (35.3)	6 (35.3)	3 (17.6)	22
Other	64	39 (60.9)	48 (75.0)	14 (21.9)	24 (37.5)	17 (26.6)	74
Unemployed	90	64 (71.1)	69 (76.7)	25 (27.8)	41 (45.6)	21 (23.3)	90
Illness knowledge							
Insect bite / worm	31	21 (67.7)	26 (83.4)	9 (29.0)	15 (48.4)	12 (38.7)	49
Magic	33	18 (54.5)	20 (60.6)	4 (12.1)	20 (60.6)	5 (15.2)	21
Sprain/injure foot	30	19 (63.3)	23 (76.7)	7 (23.3)	14 (46.7)	6 (20.0)	21
Chill	43	24 (55.8)	31 (72.1)	5 (11.6)	26 (60.5)	16 (37.2)	34
Other	41	16 (39.0)	21 (51.2)	9 (22.0)	20 (48.8)	12 (29.3)	32
Don’t know	177	125 (70.6)	139 (78.5)	46 (26.0)	71 (40.1)	47 (26.6)	252

Table 18 reports other self-care practices which respondents do not currently do but can be done to help one's leg. Although the number of responses was lower than that of self-care in general, its preference and frequency tended to be similar. Only slight gender differences were found in self-efficacy, but regional differences were significant (χ^2=120.25, df=22, p<0.01). Because of the number of responses, people in La Plaine were much more willing to do their leg treatment. This tendency is similar to self-care practices currently being done for legs. People who answered other practices recorded 120, but 53 (16.8 %) and 18 (5.7 %) people responded "nothing" and "don't know" in that order.

Other socio-demographic variables were also included in the analysis of potential self-care practices (Table 19). The selection of the practices was dependent on the frequency in Table 18 (hygiene, wearing shoes, herbal remedy, pomade, and other). The rest were categorized as "other2". Unlike current self-care practices for legs, other practices which can be done in the future varied significantly by education (χ^2=44.06, df=25, p=0.01) and knowledge of the illness (χ^2=73.21, df=25, p<0.01).

Table 18. Gender, Town vs. Possible Leg Care in the Future (n (% N), *: 1 missing, **: different among towns ($p<0.05$)).

	Total (N = 316)	Gender		Town* **		
		Male (N = 61)	Female (N = 255)	Arcahaie (N=120)	Cabaret (N = 72)	La Plaine (N=123)
Hygiene	108 (34.2)	18 (29.5)	90 (35.3)	17 (14.2)	17 (23.6)	74 (60.2)
Wearing shoes	119 (37.7)	22 (36.1)	97 (38.0)	27 (22.5)	19 (26.4)	73 (59.3)
Permanganate	15 (4.7)	1 (1.6)	14 (5.5)	1 (0.8)	2 (2.8)	12 (9.8)
Creme	14 (4.4)	0 (0)	14 (5.5)	1 (0.8)	0 (0)	13 (10.6)
Elevation	29 (9.2)	3 (4.9)	26 (10.2)	6 (5.0)	6 (8.3)	22 (17.9)
Massage	19 (6.0)	4 (6.6)	15 (5.9)	2 (1.7)	1 (1.4)	16 (13.0)
Exercise	3 (0.9)	0 (0)	3 (1.1)	2 (1.7)	0 (0)	1 (0.8)
Bandage	43 (13.6)	4 (6.6)	39 (15.3)	12 (10.0)	5 (6.9)	26 (21.1)
Medicine	50 (15.8)	13 (21.3)	37 (14.5)	21 (17.5)	16 (22.2)	13 (10.6)
Herbal remedy	114 (36.1)	18 (29.5)	96 (37.6)	49 (40.8)	21 (29.2)	44 (35.8)
Pomade	79 (25.0)	16 (37.7)	63 (26.3)	34 (30.0)	26 (44.4)	19 (17.9)
Other or don’t know	120 (38.0)	20 (32.8)	100 (39.2)	47 (39.2)	35 (48.6)	37 (30.0)

Table 19. Other Socio-demographic Variables vs. Possible Leg Care in the Future (n (% N), "other2" indicates the sum of the rest of practices so that the number doesn't reflect the proportion of N, *: $p < 0.05$).

	N	Hygiene	Wearing shoes	Herbal remedy	Pomade	Other	Other2
Age group (yrs)							
19 or less	33	13 (39.4)	16 (48.5)	14 (42.4)	13 (39.4)	10 (30.3)	21
20 - 29	42	11 (26.2)	15 (35.7)	15 (35.7)	11 (26.2)	15 (35.7)	29
30 – 39	49	20 (40.8)	20 (40.8)	16 (32.7)	8 (16.3)	21 (42.9)	28
40 – 49	64	15 (23.4)	18 (28.1)	18 (28.1)	11 (17.2)	27 (42.2)	36
50 – 59	52	20 (38.5)	21 (40.4)	23 (44.2)	15 (28.9)	21 (40.4)	29
60 – 69	39	14 (35.9)	14 (35.9)	19 (48.7)	11 (28.2)	11 (28.2)	16
70 or more	34	13 (38.2)	13 (38.2)	9 (26.5)	8 (23.5)	15 (44.1)	12
Missing	3	2 (66.7)	2 (66.7)	0 (0)	2 (66.7)	0 (0)	2
Age of onset (yrs)							
9 or less	15	7 (46.7)	6 (40.0)	7 (46.7)	4 (26.5)	5 (33.3)	10
10 – 19	92	26 (28.3)	35 (38.0)	39 (42.4)	28 (30.4)	32 (34.8)	51
20 – 29	58	21 (36.2)	22 (37.9)	18 (31.0)	11 (19.0)	23 (39.7)	33
30 – 39	51	15 (29.4)	14 (27.5)	18 (35.3)	9 (17.6)	23 (45.1)	32
40 – 49	34	11 (32.4)	14 (41.2)	13 (38.2)	7 (20.6)	12 (35.3)	19
50 or more	29	4 (13.8)	14 (48.3)	11 (37.9)	9 (31.0)	9 (31.0)	14
Missing	37	14 (37.8)	14 (37.8)	8 (21.6)	11 (29.7)	16 (43.2)	14
Education (yrs) *							
2 or less (preparatory)	157	44 (28.0)	45 (28.7)	57 (36.3)	39 (24.8)	66 (42.0)	56
3 – 4 (elementary)	33	18 (54.5)	20 (60.6)	13 (39.4)	11 (33.3)	13 (34.4)	19
5 – 6 (intermediate)	40	13 (32.5)	15 (37.5)	16 (40.0)	8 (20.0)	16 (40.0)	26
7 – 10 (secondary)	40	9 (22.5)	23 (57.5)	16 (40.0)	14 (35.0)	6 (15.0)	43
11 or more (higher)	37	10 (27.0)	12 (32.4)	11 (29.7)	5 (13.5)	15 (40.5)	22
Missing/refused	9	4 (44.4)	4 (44.4)	1 (11.1)	2 (22.2)	4 (44.4)	7

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Table 19 (Continued).

	N	Hygiene	Wearing shoes	Herbal remedy	Pomade	Other	Other2
Daily income (gde)							
25 or less	33	4 (12.1)	5 (15.2)	11 (33.3)	2 (6.1)	16 (48.5)	13
26 – 50	28	7 (25.0)	6 (21.4)	7 (25.0)	5 (17.9)	10 (35.7)	16
51 – 100	29	8 (27.6)	8 (27.6)	10 (34.5)	3 (10.3)	17 (38.6)	10
101 – 200	25	16 (64.0)	17 (68.0)	12 (48.0)	8 (32.0)	6 (24.0)	12
201 – 400	29	10 (34.5)	13 (44.8)	12 (41.4)	8 (27.6)	13 (44.0)	19
401 or more	28	15 (53.6)	17 (60.7)	7 (25.0)	9 (32.1)	14 (50.0)	21
Missing/refused	144	48 (33.3)	53 (36.8)	55 (38.2)	44 (30.6)	44 (30.6)	78
Occupation							
Farmer	44	7 (15.9)	8 (18.2)	17 (38.6)	10 (22.7)	18 (40.9)	17
Seller at home	66	24 (36.4)	25 (37.9)	21 (31.8)	12 (18.2)	29 (43.9)	37
Seller at market	52	18 (34.6)	22 (42.3)	20 (38.5)	17 (32.7)	19 (36.5)	27
Tailor / seamstress	17	7 (41.2)	7 (41.2)	5 (29.4)	1 (5.9)	10 (58.4)	18
Other	64	27 (42.2)	33 (51.6)	24 (37.5)	14 (21.9)	16 (25.0)	48
Unemployed	90	29 (32.2)	28 (31.1)	31 (34.4)	25 (27.8)	36 (40.0)	39
Illness knowledge *							
Insect bite / worm	31	12 (38.7)	15 (48.4)	13 (41.9)	11 (35.5)	8 (25.8)	34
Magic	33	2 (6.1)	4 (12.1)	12 (36.4)	12 (36.4)	15 (45.5)	7
Sprain/injure foot	30	2 (6.7)	3 (10.0)	15 (50.0)	6 (20.0)	11 (36.7)	7
Chill	43	13 (30.2)	14 (32.6)	17 (39.5)	14 (32.6)	15 (34.9)	21
Other	41	7 (17.1)	8 (19.5)	18 (43.9)	10 (24.4)	19 (46.3)	12
Don’t know	177	78 (44.1)	82 (46.3)	55 (31.1)	36 (20.3)	69 (39.0)	106

Table 20 shows the degree of confidence for leg care. Nearly 90 % of people reported that they were at least somewhat confident in their ability to care for their legs. Like self-care practices for legs, there were no significant gender differences, but people in La Plaine reported higher confidence for their leg care than those in other towns (χ^2=21.79, df=2, p<0.01).

Table 20. Degree of Confidence for Leg Care (n (% N), *: 1 missing, **: different among towns (p<0.05)).

	Total (N = 316)	Gender		Town* **		
		Male (N = 61)	Female (N = 255)	Arcahaie (N = 120)	Cabaret (N = 72)	La Plaine (N = 123)
Very confident	247 (78.2)	50 (82.0)	197 (77.3)	85 (70.8)	49 (68.1)	113 (91.9)
Somewhat confident or below	69 (21.8)	11 (18.0)	58 (22.7)	35 (29.2)	23 (31.9)	10 (8.1)

Quality of Life

One of the most interesting research questions is to what extent the lymphedema condition affects quality of life, measured by the standardized QOL and subjective well-being instruments. To describe it, the scores of EuroQol, CES-D, and CDC Healthy Days were analyzed. Also, in order to observe the association between the outcomes of the scales and the variables of interest, the T-test and F-test were used to compare mean differences. At the same time, the chi-square test was performed for the categorical outcome. For the criterion of significance, $\alpha = 0.05$ was used.

EuroQol

Table 21 presents the results of the EuroQol questionnaire. More than 70 % of respondents reported no problems in four of five health categories. Above all, none of them had extreme problems in mobility or self-care. Only six people were unable to perform their usual activities. Also, anxiety/depression was less likely to be severe among them. A gender difference was found only for mobility (χ^2=5.67, df=1, p=0.02). Females were 2.02 times more likely than males to have problems in walking (RR=2.02, 95% CI: 1.07<RR<3.80). On the other hand, more than half of respondents felt some degree of pain/discomfort. Though the gender difference was not statistically significant for the latter variable, regional differences were prominent (χ^2=19.23, df=4, p<0.01). In particular, respondents from Arcahaie seemed to experience more severe pain/discomfort,

but people in La Plaine reported less pain. A similar pattern was also found for overall health status ($F=12.19$, $df=2, 312$, $p<0.01$). Figure 5 shows the clear regional differences visually. Though not significant, the degree of anxiety/depression was different across towns ($\chi^2=5.34$, $df=2$, $p=0.07$). Thus, the results indicated that people in La Plaine experienced milder symptoms of LF than those in other places.

The results of the EuroQol scale were also compared with other socio-demographic variables, including stage of the illness. Table 22 shows the number and percent of people not reporting any health problems in the five categories and the average health score, and Figure 6 depicts the difference of overall health status by the variables of interest. Of those variables, age group and educational level had a strong association with QOL measures. Mobility, usual activities, pain/discomfort, and overall health status varied significantly within them (all p-values < 0.05). Though not significant, age group was also associated with self-care (p-values < 0.10). In general, older people were more likely to report poorer health status, and people who completed more formal education tended to maintain better health status. Also, QOL varied by stage of the illness. There were significant differences in mobility and usual activities by stage of both legs (all p-values < 0.05); however, the other health categories including overall health status varied significantly by stage of one leg only. The other variables had a partial impact on the QOL measures. Occupation seems to substantially impact mobility, usual activities, and overall health condition (all p-values < 0.05), but the small number of respondents in tailor/seamstress category and the large number in other occupation may negatively affect the outcomes so that it would be difficult to observe the impact of the variable correctly. The QOL scores were also significantly different in usual activities for age of onset, self-

care for knowledge of the illness, and pain/discomfort for both categories (all p-values < 0.05); however, it is difficult to observe the patterns of the scores. No differences were observed by income.

Table 21. Gender, Town vs. EuroQol (#: 1 missing, *: different between gender (p<0.05), **: different among towns (p<0.05)).

		Total (N=316)	Gender		Town #		
			Male (N=61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
Mobility (n (% N)) *	No problem	231 (73.1)	52 (85.3)	179 (70.2)	83 (69.2)	58 (80.6)	89 (72.4)
	Some problem	85 (26.9)	9 (14.8)	76 (29.8)	37 (30.8)	14 (19.4)	34 (27.6)
Self-care (n (% N))	No problem	287 (90.8)	56 (91.8)	231 (90.6)	107 (89.1)	65 (90.3)	114 (92.7)
	Some problem	29 (9.2)	5 (8.2)	24 (9.4)	13 (10.8)	7 (9.7)	9 (7.3)
Usual activities (n (% N))	No problem	233 (73.7)	45 (73.4)	188 (73.7)	84 (70.0)	57 (79.2)	91 (74.0)
	Some problem	75 (23.7)	12 (19.7)	63 (24.7)	32 (26.7)	13 (18.1)	30 (24.4)
	Unable to perform	6 (1.9)	3 (4.9)	3 (1.2)	3 (2.5)	2 (2.8)	1 (0.8)
	Ambiguous response	1 (0.3)	1 (1.6)	0 (0)	0 (0)	0 (0)	0 (0)
	Missing	1 (0.3)	0 (0)	1 (0.4)	1 (0.8)	0 (0)	0 (0)
Pain/discomfort (n (% N)) **	No problem	138 (43.7)	27 (44.3)	111 (43.5)	37 (30.8)	32 (44.4)	69 (56.1)
	Some problem	158 (50.0)	30 (49.2)	128 (50.2)	70 (58.3)	35 (48.6)	52 (42.3)
	Extreme	19 (6.0)	3 (4.9)	16 (6.3)	12 (10.0)	5 (6.9)	2 (1.6)
	Ambiguous response	1 (0.3)	1 (1.6)	0 (0)	1 (0.8)	0 (0)	0 (0)
Anxiety /depression (n (% N))	No	237 (75.0)	45 (73.4)	192 (75.3)	83 (69.2)	51 (70.8)	103 (83.7)
	Moderate	63 (19.9)	14 (23.0)	49 (19.2)	25 (20.8)	18 (25.0)	19 (15.5)
	Extreme	9 (2.9)	1 (1.6)	8 (3.1)	7 (5.8)	1 (1.4)	1 (0.8)
	Missing	7 (2.2)	1 (1.6)	6 (2.4)	5 (4.2)	2 (2.8)	0 (0)
Overall health status (mean ± SD) **		57.1 ± 17.3	59.7 ± 22.8	56.5 ± 18.5	53.8 ± 15.5	53.2 ± 14.0	63.0 ± 18.9

Figure 5. Gender, Town vs. Overall Health Status by EuroQol.

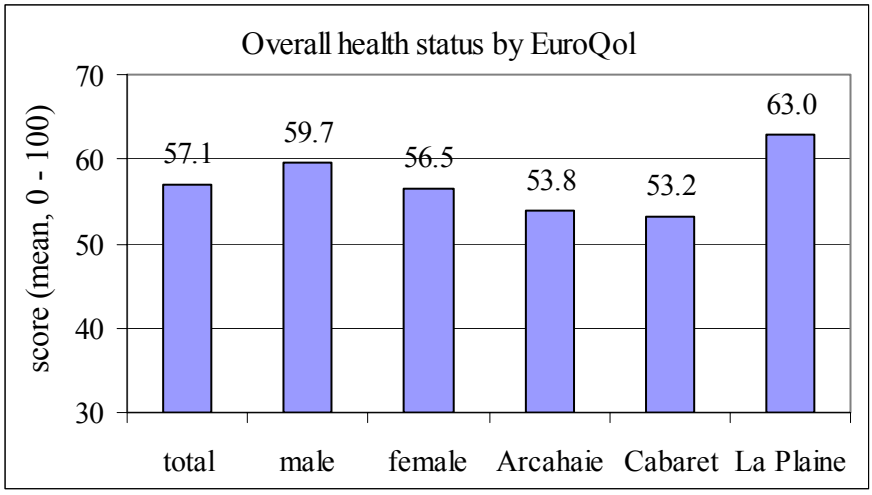

Table 22. Filariasis Related Variables vs. People Answered No Problem in EuroQol Questionnaires (n (% N)) and EuroQol Overall Health Status (mean ± SD) (*[1]: different among age group, *[2]: different among age of onset, *[3]: different among education level, *[4]: different among occupation, *[5]: different among knowledge of the illness, *[6]: different among right leg, *[7]: different among left leg (all $p<0.05$)).

	N	Mobility *[1]	Self-care	Usual activities *[1] *[2]	Pain / discomfort *[1] *[2]	Anxiety / depression	Overall health status *[1]
Age group (yrs)							
19 or less	33	28 (84.8)	30 (90.9)	30 (90.9)	20 (60.6)	29 (87.9)	63.6 ± 17.8
20 – 29	42	33 (78.6)	41 (97.6)	34 (81.0)	22 (52.4)	29 (69.0)	58.1 ± 15.5
30 – 39	49	39 (79.6)	47 (95.9)	42 (85.7)	21 (42.9)	40 (81.6)	61.2 ± 15.6
40 – 49	64	51 (79.7)	61 (95.3)	54 (84.4)	33 (51.6)	46 (71.9)	55.0 ± 16.0
50 – 59	52	33 (63.5)	44 (84.6)	34 (65.4)	16 (30.8)	39 (75.0)	54.6 ± 17.0
60 – 69	39	26 (66.7)	33 (84.6)	22 (56.4)	12 (30.8)	28 (71.8)	56.4 ± 20.4
70 or more	34	19 (55.9)	28 (82.4)	12 (35.3)	11 (32.4)	23 (67.6)	49.7 ± 14.9
Missing/refused	3	2 (66.7)	3 (100.0)	3 (100.0)	3 (100.0)	3 (100.0)	86.7 ± 23.1
Age of onset (yrs)							
9 or less	15	12 (80.0)	14 (93.3)	12 (80.0)	4 (26.7)	10 (66.7)	64.0 ± 10.6
10 – 19	92	71 (77.2)	84 (92.1)	77 (83.7)	44 (47.8)	70 (76.1)	57.6 ± 17.1
20 – 29	58	41 (70.7)	52 (89.7)	39 (67.2)	31 (53.4)	43 (74.1)	57.9 ± 18.2
30 – 39	51	41 (80.4)	45 (88.2)	38 (74.5)	15 (29.4)	36 (70.6)	57.3 ± 15.8
40 – 49	34	25 (73.5)	31 (91.2)	28 (82.4)	19 (55.9)	28 (82.4)	53.5 ± 19.1
50 or more	29	20 (69.0)	28 (96.6)	17 (58.6)	5 (17.2)	23 (79.3)	56.9 ± 18.1
Missing/refused	37	21 (56.8)	33 (89.2)	22 (59.5)	20 (54.1)	27 (73.0)	55.1 ± 18.5

(Continued on the next page)

Table 22 (Continued).

	N	Mobility	Self-care *5	Usual activities *3 *4	Pain / discomfort *3 *5	Anxiety / depression	Overall health status *3 *4
Education (yrs)							
2 or less	157	106 (67.5)	136 (86.7)	100 (63.7)	54 (34.4)	108 (68.8)	53.1 ± 16.8
3 – 4	33	23 (69.7)	31 (93.9)	26 (78.8)	15 (45.5)	26 (78.8)	59.4 ± 18.2
5 – 6	40	32 (80.0)	38 (95.0)	33 (82.5)	25 (62.5)	35 (75.0)	60.5 ± 15.7
7 – 10	40	33 (82.5)	39 (97.5)	36 (90.0)	20 (50.0)	32 (80.0)	62.0 ± 14.2
11 or more	37	31 (83.8)	35 (94.6)	30 (81.1)	19 (51.4)	28 (75.7)	60.5 ± 18.8
Missing/refused	9	6 (66.7)	8 (88.9)	8 (88.9)	5 (55.6)	8 (88.9)	68.9 ± 21.5
Occupation							
Farmer	44	34 (77.3)	39 (88.6)	34 (77.3)	19 (43.2)	33 (75.0)	55.2 ± 17.0
Seller at home	66	45 (68.2)	59 (89.4)	42 (63.6)	25 (37.9)	49 (74.2)	55.0 ± 15.5
Seller at market	52	36 (69.2)	48 (92.3)	40 (76.9)	19 (36.5)	37 (71.2)	59.2 ± 16.4
Tailor/seamstress	17	15 (88.2)	15 (88.2)	14 (82.4)	12 (70.6)	14 (82.4)	58.2 ± 18.1
Unemployed	90	57 (63.3)	80 (88.9)	59 (65.6)	40 (44.4)	68 (75.6)	52.6 ± 18.1
Other	64	54 (84.4)	61 (95.3)	56 (87.5)	34 (53.1)	50 (78.1)	64.2 ± 17.4
Illness knowledge							
Insect bite	31	21 (67.7)	28 (90.3)	22 (71.0)	8 (25.8)	22 (71.0)	58.4 ± 13.9
Magic	33	21 (63.6)	26 (78.8)	19 (57.6)	7 (21.2)	18 (54.5)	53.9 ± 17.1
Sprain	30	23 (76.7)	25 (83.3)	22 (73.3)	10 (33.3)	20 (66.7)	58.7 ± 14.8
Chill	43	31 (72.1)	39 (90.7)	30 (69.8)	13 (30.2)	32 (74.4)	51.9 ± 13.7
Other	41	29 (70.7)	34 (82.9)	27 (65.9)	15 (36.6)	29 (70.7)	52.7 ± 16.7
Don’t know	177	133 (75.1)	169 (95.5)	138 (78.0)	93 (52.5)	141 (79.7)	58.0 ± 18.8

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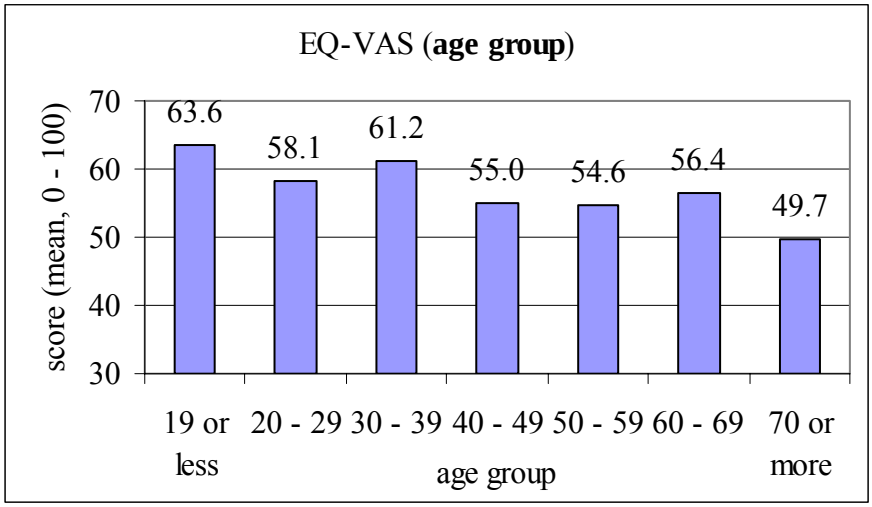
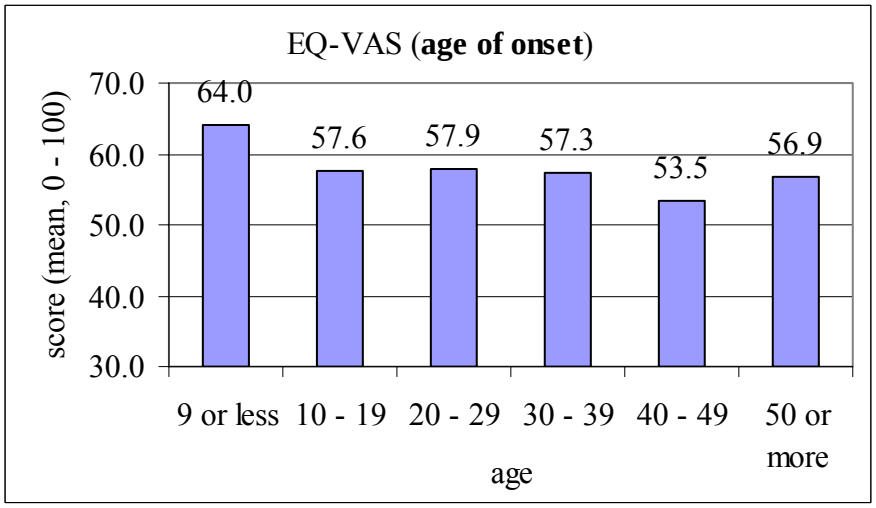
Table 22 (Continued).

	N	Mobility *6 *7	Self-care	Usual activities *6 *7	Pain / discomfort *7	Anxiety / depression	Overall health status *6
Daily income (gde)							
25 or less	33	25 (75.8)	27 (81.8)	20 (60.6)	14 (42.4)	24 (72.7)	54.5 ± 17.0
26 – 50	28	22 (78.6)	26 (92.9)	22 (78.6)	12 (42.9)	18 (64.3)	53.2 ± 19.3
51 – 100	29	21 (72.4)	26 (89.7)	21 (72.4)	11 (37.9)	21 (72.4)	52.8 ± 17.1
101 – 200	25	20 (80.0)	23 (92.0)	20 (80.0)	9 (36.0)	19 (76.0)	58.4 ± 14.9
201 – 400	29	23 (79.3)	29 (100.0)	24 (82.8)	16 (55.2)	23 (79.3)	59.7 ± 15.9
401 or more	28	20 (71.4)	27 (96.4)	23 (82.1)	9 (32.1)	21 (75.0)	58.9 ± 15.9
Missing/refused	144	100 (69.4)	129 (89.6)	103 (71.5)	67 (46.5)	111 (77.1)	58.3 ± 17.9
Stage of right leg							
Normal	43	40 (93.0)	41 (95.3)	39 (90.7)	25 (64.1)	34 (79.1)	67.4 ± 16.0
Stage 1	106	80 (75.5)	96 (90.6)	81 (76.4)	50 (47.2)	79 (74.5)	56.1 ± 15.5
Stage 2	84	60 (71.4)	80 (95.2)	64 (76.2)	35 (41.7)	65 (77.4)	57.3 ± 14.1
Stage 3	52	34 (65.4)	44 (84.6)	29 (55.8)	15 (28.8)	38 (73.1)	51.9 ± 17.5
Stage 4 or more	29	15 (51.7)	24 (82.8)	19 (65.5)	12 (41.4)	19 (65.5)	55.9 ± 26.1
Missing/NA	2	2 (100.0)	2 (100.0)	1 (50.0)	1 (50.0)	2 (100.0)	35.0 ± 7.1
Stage of left leg							
Normal	26	21 (80.8)	25 (96.2)	24 (92.3)	18 (69.2)	20 (76.9)	61.2 ± 21.4
Stage 1	71	61 (85.9)	70 (98.6)	60 (84.5)	37 (52.1)	60 (84.5)	56.8 ± 14.4
Stage 2	125	88 (70.4)	109 (87.2)	91 (72.8)	51 (40.8)	84 (67.2)	57.8 ± 17.3
Stage 3	58	38 (65.5)	51 (87.9)	39 (67.2)	17 (29.3)	46 (79.3)	53.6 ± 16.3
Stage 4 or more	34	21 (61.8)	30 (88.2)	18 (52.9)	14 (41.1)	25 (73.5)	59.7 ± 20.1
Missing/NA	2	2 (100.0)	2 (100.0)	1 (50.0)	1 (50.0)	2 (100.0)	30.0 ± 0.0

Figure 6. Other Socio-demographic Variables vs. Overall Health Status by EuroQol.





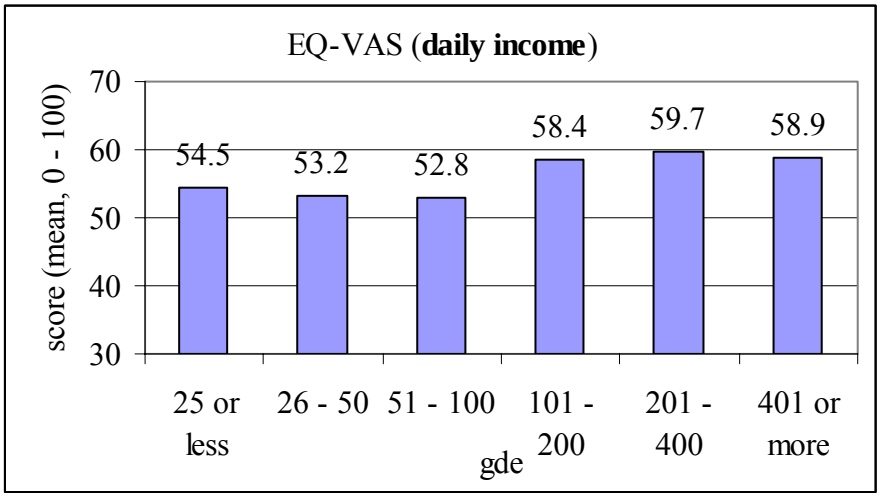


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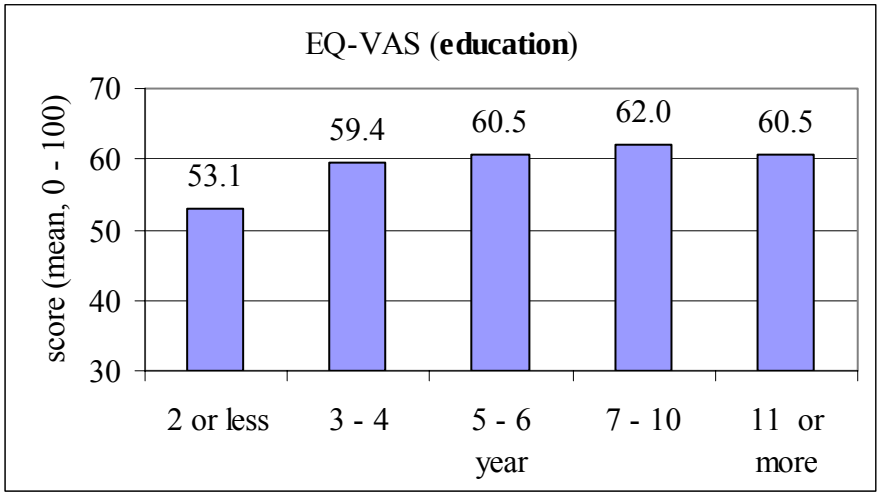
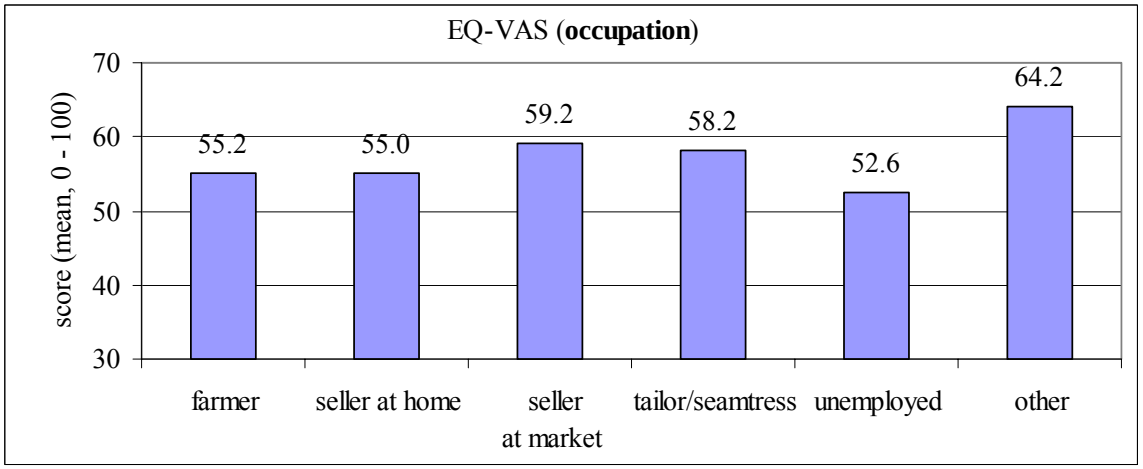
Figure 6 (Continued).





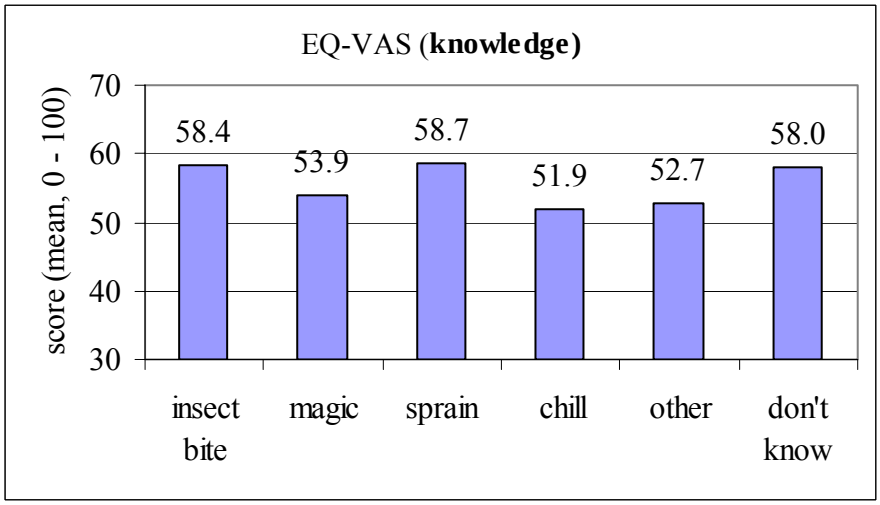


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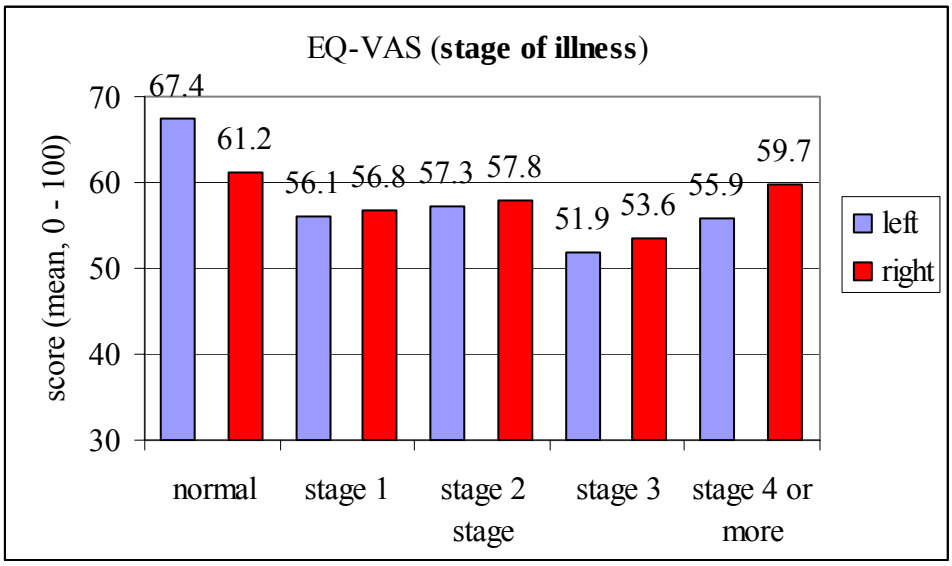
Figure 6 (Continued).



CES-D

Table 23 shows the total scores on the CES-D scale. The mean score and its standard deviation were 13.2 and 9.5, respectively. For gender comparison, females were more likely to have higher score than males ($T=1.95$, $df=314$, $p=0.05$), but regional differences were more marked ($F=58.03$, $df=2, 312$, $p<0.01$). Especially, people living in La Plaine had much higher depression scores than those from the other areas. Since people with a total score of 16 or above are generally considered as a depressive case (Eaton et al., 2003), Table 20 also shows the proportion of respondents scoring above 16. More than one-third of the total sample had a score of 16 or more. The score of people in La Plaine was prominently higher than the comparison groups.

Total CES-D scores and the proportion of depressive cases in relation to other socio-demographic variables are shown in Table 24. There were no significant statistical differences in both scores and depressive cases for current age, age of onset, income, educational level, and knowledge of the illness. Only the stage of the illness was strongly associated with depression scores (p-values < 0.05); however, no linear or systematic variation was observed.

Table 23. Gender, Town vs. Total CES-D Score (mean ± SD, (Range)) and the Proportion of the Score Indicating Depressive Cases (n (% N)) (*: 1 missing, **: different among towns ($p<0.05$)).

	Total (N=315)	Gender		Town *		
		Male (N=61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
CES-D score **	13.2 ± 9.5 (0 – 41)	11.1 ± 8.4 (0 – 27)	13.7 ± 9.7 (0 – 41)	9.3 ± 7.0 (0 – 33)	9.1 ± 6.7 (0 – 24)	19.4±9.8 (0– 41)
below 16	198 (62.6)	42 (68.9)	156 (61.2)	102 (85.0)	58 (80.6)	37 (30.1)
16 or more	118 (37.3)	19 (31.2)	99 (38.9)	18 (15.0)	14 (19.4)	86 (69.9)

Table 24. Other Socio-demographic Variables vs. Total CES-D Score (mean ± SD) and the Proportion of the Score Indicating Depressive Cases (n (% N)) (*: p<0.05 for both score and depression level).

	N	Score	Depression level
Age group (yrs)			
19 or less	33	10.9 ± 9.1	12(36.4)
20 – 29	42	12.3 ± 8.7	14(33.3)
30 – 39	49	14.4 ± 9.9	19(38.8)
40 – 49	64	12.6 ± 8.7	21(32.8)
50 – 59	52	11.9 ± 8.6	15(28.8)
60 – 69	39	13.6 ± 9.9	18(50.0)
70 or more	34	16.3 ±11.2	17(50.0)
Missing	3	24.3 ±16.5	2 (66.7)
Age of onset (yrs)			
9 or less	15	13.7 ± 9.0	6 (40.0)
10 – 19	92	11.2 ± 8.4	26(28.3)
20 – 29	58	15.3 ± 9.6	27(46.6)
30 – 39	51	13.4 ± 8.9	19(37.3)
40 – 49	34	11.8 ±10.1	11(32.4)
50 or more	29	14.3 ±11.0	12(41.4)
Missing	37	14.9 ±10.8	17(45.9)
Daily income (gde)			
25 or less	33	15.4 ± 7.3	16(48.5)
26 – 50	28	12.9 ± 8.5	8(28.6)
51 – 100	29	12.9 ± 9.4	10(34.5)
101 – 200	25	11.4 ±10.8	9(36.0)
201 – 400	29	13.0 ±11.6	9(31.0)
401 or more	28	14.1 ±12.3	11(39.3)
Missing	144	13.0 ± 8.9	55(38.2)
Education (yrs)			
2 or less	157	13.0 ± 8.9	58(36.9)
3 – 4	33	11.9 ±10.7	11(33.3)
5 – 6	40	14.1 ± 9.2	15(37.5)
7 – 10	40	12.6 ±11.1	17(42.5)
11 or more	37	13.6 ± 8.3	12(32.4)
Missing	9	18.3 ±13.3	5 (55.6)

	N	Score	Depression level
Occupation			
Farmer	44	10.8 ± 7.5	9 (20.5)
Sell – home	66	15.7 ± 10.6	31(47.0)
Sell – market	52	12.3 ± 10.4	16(30.8)
Tailor	17	14.3 ± 8.5	6 (35.3)
Other	64	12.9 ± 9.4	29(45.3)
Unemployed	90	13.7 ± 9.1	35(38.9)
Illness knowledge			
Insect bite	31	12.2 ± 9.9	11 (35.5)
Magic	33	11.6 ± 7.4	10 (30.3)
Sprain	30	11.9 ± 7.4	10 (33.3)
Chill	43	11.6 ± 9.0	14 (32.6)
Other	41	10.5 ± 7.7	10 (24.4)
Don't know	177	14.6 ± 10.3	76 (42.9)
Stage of right leg *			
Normal	43	15.2 ± 10.3	20 (46.5)
Stage 1	106	12.4 ± 8.6	34 (32.1)
Stage 2	84	10.3 ± 9.2	22 (26.2)
Stage 3	52	14.7 ± 9.7	23 (44.2)
Stage 4 plus	29	18.8 ± 9.3	18 (62.1)
Missing	2	16.5 ± 3.5	1 (50.0)
Stage of left leg *			
Normal	26	14.7 ± 11.2	14 (53.9)
Stage 1	71	12.3 ± 7.6	20 (28.2)
Stage 2	125	11.1 ± 8.7	38 (30.4)
Stage 3	58	13.7 ± 10.3	20 (17.0)
Stage 4 plus	34	21.1 ± 9.7	26 (76.5)
Missing	2	11.5 ± 3.5	0 (0.0)

CDC Healthy Days

Table 25 and Figure 7 present the self-rated general health status as measured by the CDC Healthy Days questionnaire. Slightly more than half (52.8 %) of the respondents felt they maintained at least a good health status, and 88 % thought their condition was fair or above. There were no significant gender differences, but more people in La Plaine fell into excellent or fair health conditions than others (χ^2=35.21, df=8, p<0.01).

Table 26 shows the number of unhealthy days reported for each health condition. The first four health categories derived from the core questions which asked general unhealthy days in the past 30 days (*physically unhealthy days, mentally unhealthy days, activity limitation days, overall unhealthy days in past 30 days*). The average physically and mentally unhealthy days recorded 5 to 6 days; in contrast, fewer activity limitation days were reported. Overall unhealthy days in past 30 days are the combination of both physically and mentally unhealthy days in the 30-day period. The average unhealthy days was 9.9 days. There were no significant gender differences or regional differences; however, females tended to experience more overall unhealthy days in general but p-value of the statistical test slightly exceeded at $\alpha = 0.05$ (T=1.81, df=299, p=0.07). Likewise, residents of La Plaine were likely to report more mentally unhealthy days (F=2.39, df=2, 306, p=0.09). The result of mentally unhealthy days was similar to the outcome of CES-D score.

Additional five health categories focus on more specific health conditions in the same manner (*pain days, depression days, anxiety days, sleepless days, vitality days*).

None of the unhealthy days among all respondents exceeded more than a week. There were no significant statistical differences by gender, but females were more likely to report more frequent days in pain (T=1.95, df=310, p=0.05). Also, no significant regional differences were observed, but the differences between Cabaret and La Plaine were more likely to be obvious in depression days and anxiety day (p-values ≤ 0.11). There were no significant differences in pain day by locality.

Table 27 illustrates the details of reported activity limitation. About half of respondents thought their activities were limited due to their health impairments. There were no significant differences for gender or region. The rest of the questions were answered only by them. Due to an error in data collection, the major health problem had multiple answers per respondent instead of a single response, which is required by the CDC's guidelines. Therefore, the rest of questionnaire can be regarded as a general activity limitation instead of a single health problem. Slightly over three-fourths (75.5 %) of respondents reported a problem with arthritis, and over one-half (52.8 %) reported having lymphedema. The other problems mainly included headache and stomachache, but the arthritis and lymphedema were more common health problems. There were significant impairment differences across gender (χ^2=9.12, df=3, p=0.03) and towns (χ^2=13.90, df=6, p=0.03). Particularly, males voiced more complaints about lymphedema but less about other problems such as walking or high blood pressure.

Additional activity limitation indicators are shown in Table 27. The average length of activity limitation due to a major cause of impairment or health problem was 5.8 years. The length ranged from a minimum of one week up to 48 years. About 45 % of those who had activity limitations had difficulty in their routine care, but the personal

care limitation was less serious. In any case, neither gender nor regional differences were found.

Table 25. Gender, Town vs. Self-rated Health Status by CDC Healthy Days (n (% N), *: 1 missing, **: difference among towns ($p<0.05$)).

	Total (N = 316)	Gender		Town * **		
		Male (N = 61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
Excellent	9 (2.9)	1 (1.6)	8 (3.2)	0 (0)	0 (0)	9 (7.3)
Very good	38 (12.1)	10 (16.4)	28 (11.0)	14 (11.8)	4 (5.6)	20 (16.3)
Good	119 (37.8)	27 (44.3)	92 (36.2)	55 (46.2)	35 (48.6)	29 (23.6)
Fair	111 (35.2)	16 (26.2)	95 (37.4)	37 (31.1)	21 (29.2)	53 (43.1)
Poor	36 (11.4)	7 (11.5)	29 (11.4)	11 (9.2)	12 (16.7)	12 (9.8)
Do not know	2 (0.6)	0 (0)	2 (0.8)	2 (1.7)	0 (0)	0 (0)

Figure 7. Gender, Town vs. Self-rated Health Status by CDC Healthy Days.

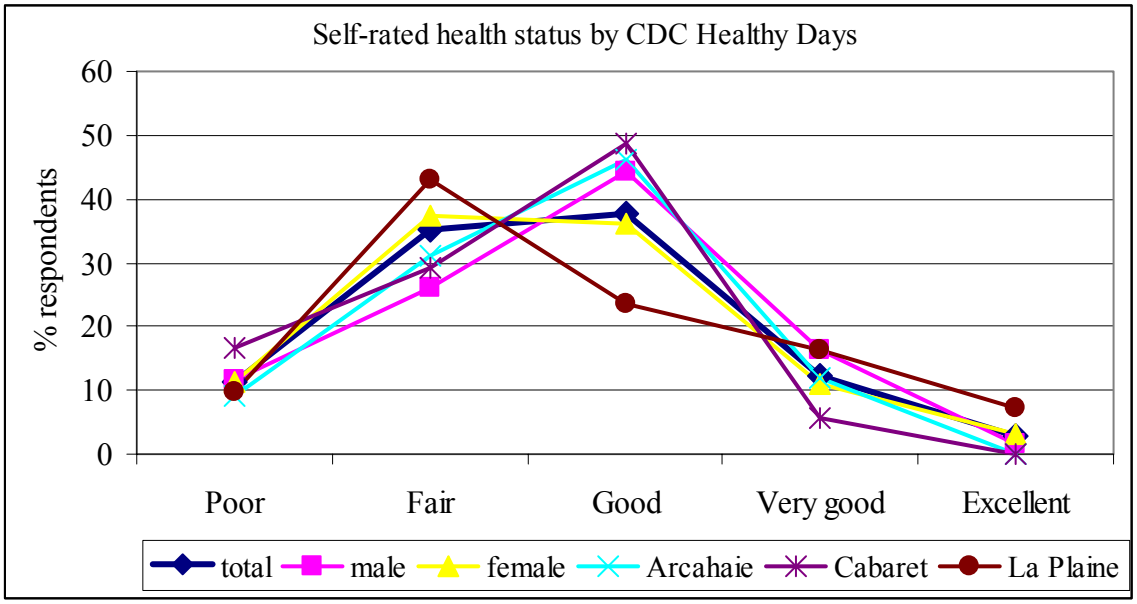


Table 26. Gender, Town vs. Healthy and Unhealthy Days (mean ± SD, all ranges are 0 - 30).

	Total	Gender		Town		
		Male	Female	Arcahaie	Cabaret	La Plaine
Physically unhealthy days	5.5 ± 7.1	4.7 ± 7.1	5.7 ± 7.1	5.4 ± 8.0	6.5 ± 7.3	5.0 ± 5.9
Mentally unhealthy days	5.3 ± 7.4	4.1 ± 7.9	5.6 ± 7.3	4.4 ± 6.9	4.8 ± 6.9	6.4 ± 7.8
Activity limitation days	3.8 ± 5.6	3.0 ± 5.5	4.0 ± 5.6	3.4 ± 5.8	4.5 ± 6.7	3.8 ± 4.8
Unhealthy days in past 30 days	9.9 ± 9.9	7.8 ± 10.1	10.4 ± 9.8	8.5 ± 10.0	10.7 ± 10.2	10.5 ± 9.5
Pain days	5.0 ± 6.5	3.6 ± 6.1	5.4 ± 6.6	4.8 ± 6.7	5.9 ± 7.5	4.8 ± 5.8
Depression days	5.0 ± 7.0	3.8 ± 6.5	5.3 ± 7.1	5.1 ± 7.1	3.7 ± 5.9	5.9 ± 7.4
Anxiety days	4.8 ± 6.8	3.5 ± 5.7	5.1 ± 7.0	4.4 ± 6.2	3.8 ± 5.5	5.8 ± 8.9
Sleepless days	4.7 ± 6.7	4.5 ± 7.2	4.8 ± 6.6	4.4 ± 6.6	3.9 ± 6.5	5.5 ± 6.9
Vitality days	6.3 ± 8.5	5.4 ± 8.2	6.5 ± 8.5	5.1 ± 7.7	7.0 ± 9.8	6.9 ± 8.0

Table 27. Gender, Town vs. Major Cause of Impairment or Health Problem (#: 1 missing, *: different between gender (p<0.05), **: different among towns (p<0.05)).

		Total (N=316)	Gender		Town #		
			Male (N=61)	Female (N=255)	Arcahaie (N=120)	Cabaret (N=72)	La Plaine (N=123)
Activity limitation (n (% N)) **		163 (51.6)	28 (45.9)	135 (52.9)	56 (46.7)	40 (55.6)	66 (53.7)
Health problem (n (% per activity limitation)) * **	Arthritis	122 (74.8)	19 (67.9)	103 (76.3)	38 (67.9)	31 (77.5)	53 (80.3)
	Back or neck problem	23 (14.1)	3 (10.7)	20 (14.8)	12 (21.4)	2 (5.0)	8 (12.1)
	Fractures, bone/joint injury	21 (12.9)	2 (7.1)	19 (14.1)	10 (17.9)	2 (5.0)	8 (12.1)
	Problem walking	25 (15.3)	1 (3.6)	24 (17.8)	10 (17.9)	2 (5.0)	13 (19.7)
	High blood pressure	23 (14.1)	1 (3.6)	22 (16.3)	6 (10.7)	3 (7.5)	14 (21.2)
	Depression/anxiety/emotional problem	20 (12.3)	3 (10.7)	17 (12.6)	6 (10.7)	6 (15.0)	8 (12.1)
	Lymphedema	84 (51.5)	20 (71.4)	60 (44.4)	37 (66.1)	25 (62.5)	21 (31.8)
	Other problem	121 (74.2)	21 (75.0)	100 (74.1)	45 (80.4)	26 (65.0)	49 (74.2)
Length of activity limitation due to health problems (mean year ± SD (Range: days - years))		5.8 ± 9.0 (7 – 48)	7.4 ± 11.2 (10 – 45)	5.5 ± 8.5 (7 – 48)	5.8 ± 8.6 (7 – 35)	7.5 ± 12.9 (14 – 48)	4.7 ± 5.9 (7 – 27)
Personal care for activity limitation (n (% per activity limitation))		39 (23.9)	9 (33.3)	30 (22.4)	13 (24.1)	12 (30.0)	14 (21.2)
Routine care for activity limitation (n (% per activity limitation))		73 (44.8)	12 (42.9)	61 (45.5)	22 (39.3)	16 (40.0)	35 (53.9)

The next three tables (Table 28 – Table 30) describe the association of the CDC Healthy Days measures with other socio-demographic variables. Table 28 reports self-rated health status and core unhealthy days. The self-rated health status indicates the number of people who described their health condition as good or above. The self-rated health condition was strongly associated with age (χ^2=31.88, df=6, p<0.01), educational level (χ^2=22.87, df=4, p<0.01), and income level (χ^2=11.85, df=5, p=0.04). People's health condition was more likely to be poor as they got older. Also, those completing higher levels of education seemed to be healthier, as did people with higher income levels. Stage of leg was also associated with general health status (p-values < 0.01). Though no systematic pattern was observed by age of onset, those with higher stages of illness tended to report lower general health status. Age of onset, occupation, and knowledge of the illness were not significantly associated with self-rated health. The details of the self-rated health status are summarized graphically in Figure 8. The relationships between unhealthy days and the variables of interest were dependent on the variables. Physically unhealthy days were significantly associated with age of onset solely (F=3.13, df=5, 263, p=0.01). Activity limitation days were associated with education (F=2.56, df=4, 298, p=0.04). On the other hand, mentally unhealthy days varied by age group (F=2.61, df=6, 300, p=0.02) and stage of left leg (F=2.41, df=4, 303, p=0.05), and overall unhealthy days were significantly different within age groups (F=2.99, df=6, 292, p=0.01), age of onset (F=2.52, df=5, 259, p=0.03), and educational level only (F=2.72, df=4, 287, p=0.03).

Table 29 reports the results from five specific statements (*pain, depression, anxiety, sleeplessness, vitality*) and demographic variables. Compared with four

unhealthy day indicators, the socio-demographic variables seem to be less important. Significant differences were found only in anxiety days for the stage of left leg ($F=4.43$, $df=4, 154$, $p<0.01$).

Table 30 corresponds to activity limitation indicators in Table 24. Because of the small number of responses for health problems in Table 24, only arthritis, lymphedema, and other problem were left in the category. The rest of the health problems were summarized as "other2". Generally, the health problems were less likely to be an important influence on activity limitation. Only the number of respondents who indicated any activity limitation was significantly different for age group, age of onset, educational level, occupation, and stage of right leg (all p-values < 0.05). Length of activity limitation, personal care, and routine care were not significantly different among the variables, except for personal care vs. education level and stage of left leg (p-values < 0.05). Similarly, the type of health problem was not significantly different within the socio-demographic variables. In general, perhaps due to the purpose of this research, arthritis and lymphedema were amongst the major problems reported among patients.

Table 28. Other Socio-demographic Variables vs. Self-rated Health Condition (n (% N)) and Unhealthy Days (mean ± SD) (*[1]: different among agegroup, *[2]: different among age of onset, *[3]: different among daily income, *[4]: different among educational level, *[5]: different among right leg, *[6]: different among left leg (all $p<0.05$)).

	N	Health condition *1 *2 *3 *4	Unhealthy days			
			Physical *2	Mental *1	Activities *4	Overall *1 *2 *4
Age group (yrs)						
19 or less	32	28 (87.5)	3.5 ± 6.3	1.9 ± 5.1	1.3 ± 3.2	4.8 ± 8.3
20 – 29	42	27 (64.3)	6.0 ± 8.2	4.5 ± 7.3	4.0 ± 6.0	8.6 ± 9.8
30 – 39	49	27 (55.1)	5.9 ± 6.7	5.7 ± 7.3	4.0 ± 5.1	10.7 ± 9.9
40 - 49	64	28 (43.8)	5.7 ± 7.4	5.8 ± 7.0	4.3 ± 6.3	10.7 ± 10.0
50 - 59	52	27 (54.0)	4.1 ± 4.7	5.1 ± 7.0	3.3 ± 5.4	9.3 ± 9.4
60 – 69	39	19 (48.7)	4.9 ± 6.3	5.0 ± 7.2	3.9 ± 4.8	9.4 ± 9.6
70 or more	34	8 (23.5)	8.6 ± 9.1	9.0 ± 10.1	5.7 ± 7.0	14.7 ± 11.0
Missing/refused	3	1 (33.3)	5.3 ± 3.9	4.3 ± 4.0	2.7 ± 2.5	11.8 ± 1.8
Age of onset (yrs)						
9 or less	15	11 (73.3)	1.8 ± 2.7	3.3 ± 8.1	1.1 ± 2.1	3.1 ± 5.3
10 – 19	91	53 (58.2)	4.9 ± 6.6	4.4 ± 6.8	3.3 ± 5.4	8.4 ± 9.7
20 – 29	58	30 (51.7)	6.5 ± 8.0	5.6 ± 7.8	4.6 ± 5.9	10.6 ± 10.0
30 – 39	51	30 (61.2)	3.8 ± 4.7	6.1 ± 8.9	3.0 ± 4.8	9.3 ± 9.6
40 – 49	34	18 (52.9)	5.6 ± 7.3	4.6 ± 4.6	5.0 ± 7.1	9.7 ± 9.8
50 or more	29	14 (48.3)	9.0 ± 9.3	6.9 ± 8.0	4.4 ± 4.6	13.7 ± 10.7
Missing/refused	37	10 (27.0)	6.2 ± 6.9	6.6 ± 7.7	4.5 ± 6.5	12.7 ± 10.2
Daily income (gde)						
25 or less	33	13 (39.4)	6.6 ± 7.4	6.7 ± 7.5	5.4 ± 5.9	11.3 ± 9.8
26 – 50	28	8 (28.6)	4.2 ± 4.7	8.1 ± 11.3	2.9 ± 4.2	11.2 ± 11.9
51 – 100	29	15 (55.6)	4.4 ± 6.4	3.8 ± 3.7	3.5 ± 5.9	8.4 ± 9.3
101 – 200	25	15 (60.0)	5.8 ± 5.3	5.0 ± 6.8	3.1 ± 3.9	10.5 ± 9.8
201 – 400	29	18 (62.1)	6.4 ± 8.5	5.8 ± 8.3	5.1 ± 6.4	10.2 ± 10.5
401 or more	28	18 (64.3)	6.5 ± 8.5	5.9 ± 8.2	4.8 ± 6.8	11.1 ± 10.6
Missing/refused	143	79 (55.3)	5.3 ± 7.2	4.6 ± 6.7	3.4 ± 5.5	9.1 ± 9.5
Education (yrs)						
2 or less	157	63 (40.7)	6.4 ± 7.5	6.2 ± 7.9	4.6 ± 6.3	11.5 ± 10.1
3 – 4	33	19 (57.6)	5.5 ± 6.6	5.8 ± 6.6	3.8 ± 4.1	10.7 ± 10.0
5 – 6	40	25 (62.5)	4.1 ± 6.2	4.7 ± 7.9	2.7 ± 4.7	7.2 ± 9.4
7 – 10	40	28 (70.0)	4.1 ± 5.7	3.6 ± 5.7	2.2 ± 4.2	7.1 ± 9.3
11 or more	36	27 (75.0)	5.7 ± 7.9	4.0 ± 6.4	2.6 ± 3.6	8.5 ± 9.4
Missing/refused	9	4 (44.4)	2.3 ± 2.8	5.2 ± 9.8	7.2 ± 9.8	6.7 ± 10.1

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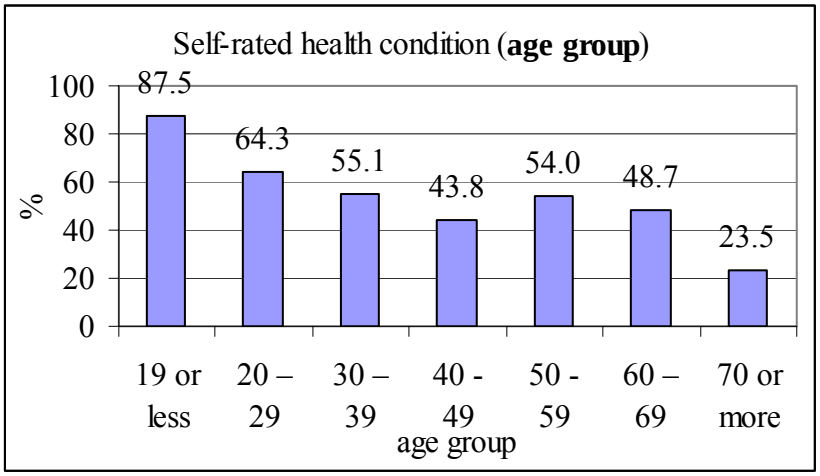
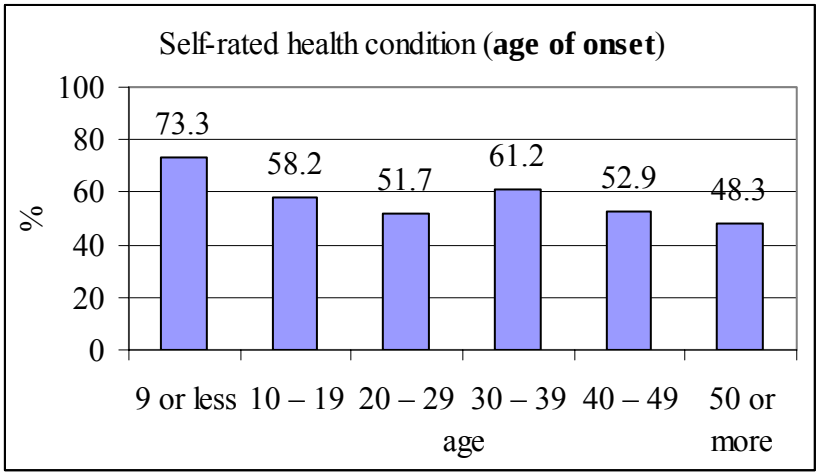
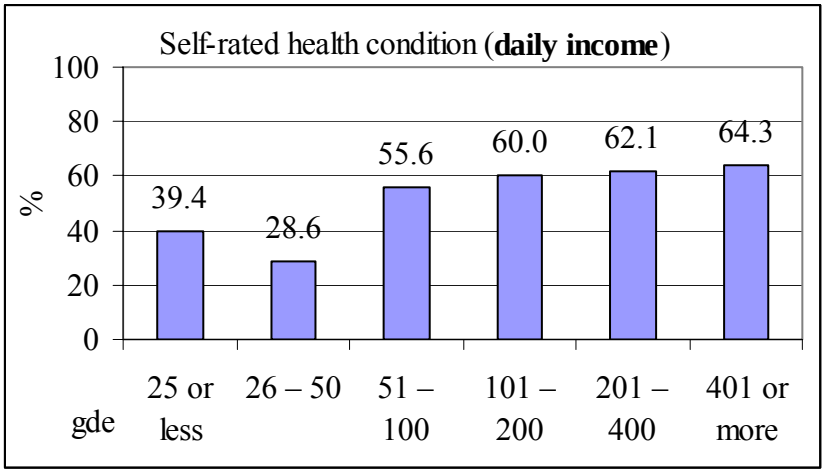
Table 28 (Continued).

	N	Health condition *5 *6	Unhealthy days			
			Physical	Mental *5 *6	Activities	Overall *6
Occupation						
Farmer	43	22 (51.2)	7.1 ± 8.6	5.8 ± 8.9	4.3 ± 6.1	11.3 ± 11.4
Seller at home	65	29 (44.6)	5.7 ± 6.4	6.3 ± 7.9	3.9 ± 5.1	11.2 ± 10.1
Seller at market	52	28 (53.9)	4.9 ± 5.6	4.3 ± 5.1	4.8 ± 6.3	9.0 ± 8.7
tailor/seamstress	17	9 (52.9)	3.8 ± 4.8	5.9 ± 8.1	2.8 ± 4.2	9.1 ± 9.8
Unemployed	90	43 (47.8)	6.4 ± 8.0	5.8 ± 7.4	4.2 ± 6.3	11.1 ± 10.1
Other	63	43 (68.3)	4.1 ± 7.0	3.9 ± 6.9	2.2 ± 3.9	6.8 ± 9.1
Illness knowledge						
Insect bite	31	21 (67.7)	8.6 ± 8.3	9.6 ± 10.8	4.5 ± 6.3	15.4 ± 12.4
Magic	31	16 (51.6)	9.2 ± 5.8	6.4 ± 8.4	6.8 ± 6.8	14.5 ± 10.0
Sprain	29	15 (51.7)	2.8 ± 3.2	4.7 ± 8.1	1.8 ± 2.3	7.2 ± 8.8
Chill	43	21 (48.9)	8.4 ± 7.3	7.3 ± 8.8	4.7 ± 3.5	14.7 ± 9.2
Other	41	25 (61.0)	9.8 ± 8.7	7.4 ± 7.8	7.5 ± 6.8	15.7 ± 11.2
Don't know	177	90 (50.9)	7.7 ± 8.5	7.1 ± 8.1	5.9 ± 7.2	13.3 ± 10.4
Stage of right leg						
Normal	43	28 (65.1)	3.5 ± 3.3	4.6 ± 7.4	1.8 ± 2.3	7.8 ± 8.5
Stage 1	106	61 (57.5)	6.1 ± 8.5	5.1 ± 7.4	4.2 ± 6.1	9.9 ± 10.5
Stage 2	83	53 (63.9)	5.2 ± 6.5	4.1 ± 5.2	4.2 ± 6.2	9.2 ± 9.5
Stage 3	52	16 (30.8)	7.0 ± 7.4	7.7 ± 9.0	3.2 ± 4.5	13.0 ± 10.6
Stage 4 or more	29	8 (27.6)	4.4 ± 6.1	5.6 ± 8.0	5.5 ± 6.7	8.0 ± 8.1
Missing/NA	2	0 (0)	4.0 ± 5.7	19.0 ±15.6	1.0 ± 1.4	23.0 ± 9.9
Stage of left leg						
Normal	26	15 (57.7)	9.0 ±10.4	8.0 ± 8.0	5.9 ± 6.1	14.5 ± 11.4
Stage 1	71	40 (56.4)	5.4 ± 6.8	5.0 ± 7.0	3.8 ± 5.2	9.7 ± 9.9
Stage 2	124	77 (62.1)	5.7 ± 7.7	4.3 ± 6.9	4.0 ± 6.6	9.0 ± 10.2
Stage 3	58	25 (43.1)	4.4 ± 4.5	5.1 ± 7.2	2.9 ± 3.7	9.0 ± 8.3
Stage 4 or more	34	9 (27.0)	4.6 ± 5.0	7.7 ± 8.6	3.4 ± 4.4	9.0 ± 8.3
Missing/NA	2	0 (0)	4.0 ± 5.7	17.0 ±18.4	1.5 ± 2.1	21.0 ± 12.7

Figure 8. Other Socio-demographic Variables vs. Self-rated Health Status by CDC Healthy Days (good or above).







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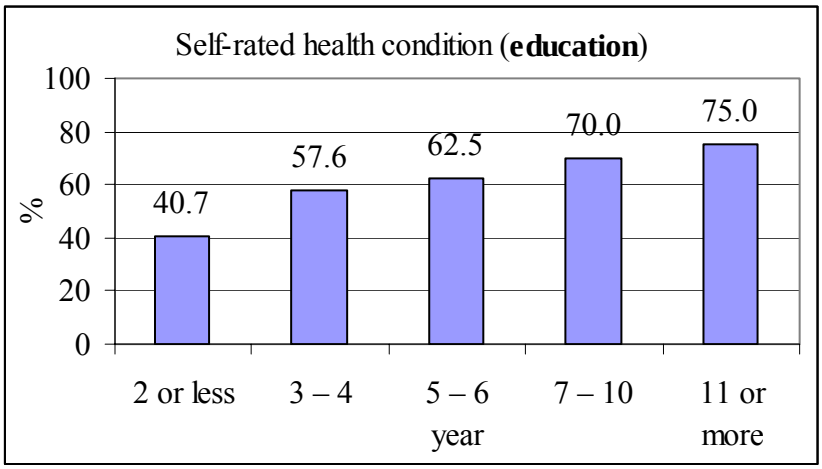

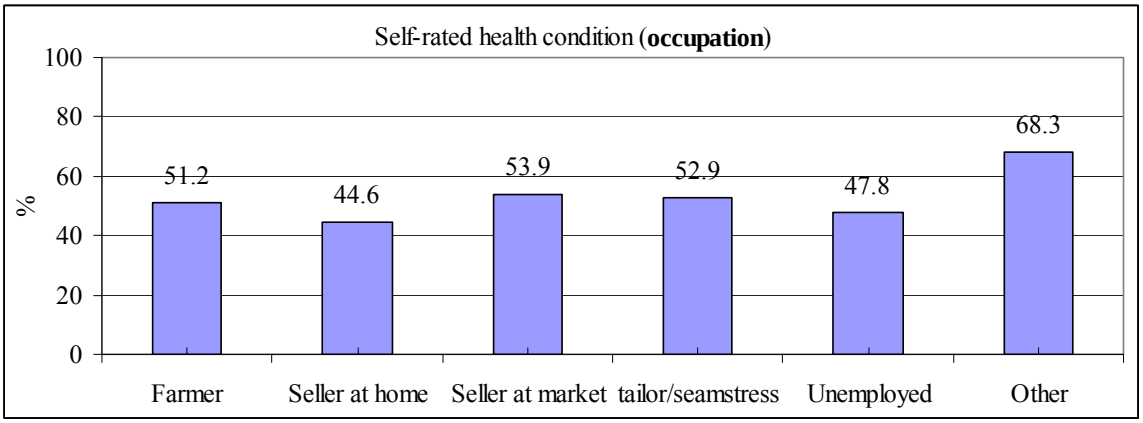

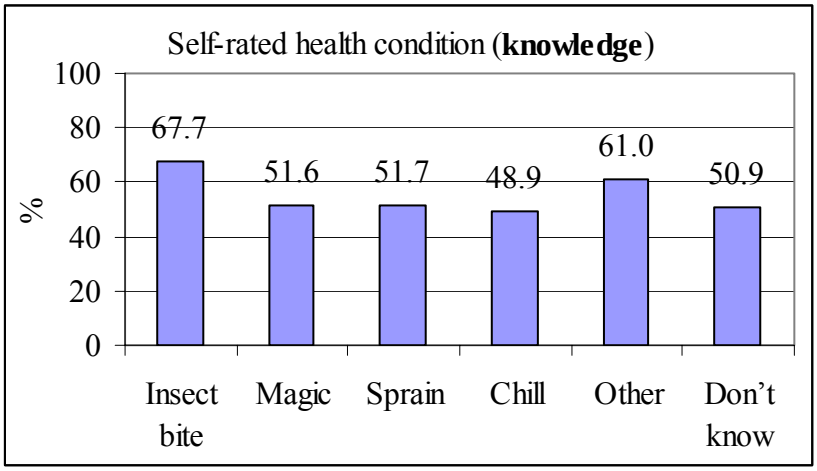

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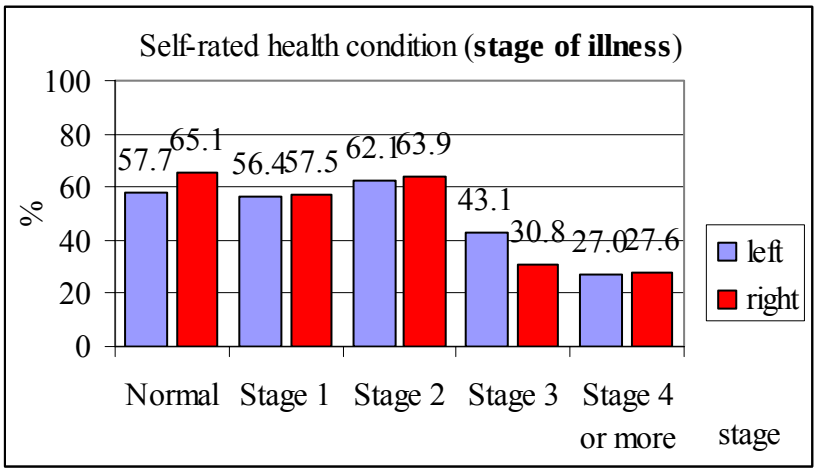

Table 29. Other Socio-demographic Variables vs. Unhealthy/healthy Days (mean ± SD) (*: different among left leg ($p<0.05$).

	Pain days	Depression days	Anxiety days	Sleepless days	Vitality days
Age group (yrs)					
19 or less	2.4 ± 4.9	2.3 ± 5.9	1.8 ± 3.3	2.6 ± 5.0	3.1 ± 6.7
20 – 29	5.7 ± 7.1	5.9 ± 8.1	5.7 ± 8.1	5.3 ± 7.3	7.1 ± 9.7
30 – 39	5.7 ± 6.7	5.7 ± 8.5	5.2 ± 7.7	5.2 ± 7.4	6.2 ± 7.9
40 - 49	5.5 ± 7.1	5.0 ± 6.5	4.9 ± 7.0	4.2 ± 6.6	6.7 ± 8.6
50 - 59	4.5 ± 5.8	4.7 ± 5.6	5.1 ± 6.4	4.7 ± 6.8	4.4 ± 6.2
60 – 69	4.2 ± 5.0	3.8 ± 4.8	4.0 ± 4.9	5.6 ± 6.8	7.9 ± 8.9
70 or more	6.9 ± 7.8	8.0 ± 8.5	6.3 ± 7.6	5.8 ± 6.4	9.7 ± 10.3
Missing/refused	3.2 ± 3.0	0.8 ± 1.4	5.0 ± 8.7	3.7 ± 3.5	0.3 ± 0.6
Age of onset (yrs)					
9 or less	2.4 ± 3.4	5.1 ± 8.6	5.6 ± 8.7	5.9 ± 8.6	4.2 ± 6.0
10 – 19	4.5 ± 6.1	4.2 ± 6.4	4.0 ± 6.5	4.5 ± 6.6	6.4 ± 9.1
20 – 29	4.6 ± 6.4	4.8 ± 7.6	5.1 ± 6.9	4.9 ± 7.5	6.5 ± 8.9
30 – 39	4.6 ± 6.0	4.8 ± 6.7	5.1 ± 7.7	4.0 ± 5.6	4.3 ± 5.8
40 – 49	6.4 ± 7.9	5.5 ± 8.0	4.6 ± 6.4	4.9 ± 7.9	6.6 ± 9.2
50 or more	5.7 ± 6.5	6.9 ± 6.9	5.9 ± 6.3	6.6 ± 7.1	9.0 ± 9.3
Missing/refused	7.0 ± 7.8	5.9 ± 6.6	5.0 ± 6.2	4.0 ± 4.6	7.2 ± 8.4
Daily income (gde)					
25 or less	5.2 ± 5.4	5.8 ± 8.0	5.3 ± 6.7	4.0 ± 6.3	9.1 ± 11.1
26 – 50	5.9 ± 7.2	3.8 ± 4.7	5.4 ± 8.1	4.8 ± 6.4	5.6 ± 8.1
51 – 100	4.3 ± 6.3	3.9 ± 4.7	3.8 ± 4.7	4.9 ± 7.0	5.6 ± 7.3
101 – 200	5.9 ± 5.4	5.1 ± 5.1	4.4 ± 4.7	6.3 ± 6.2	5.9 ± 5.2
201 – 400	6.7 ± 8.3	5.5 ± 8.1	6.3 ± 8.2	7.9 ± 10.1	6.0 ± 7.6
401 or more	7.1 ± 8.6	4.7 ± 9.6	6.2 ± 8.5	5.4 ± 7.1	6.6 ± 8.5
Missing/refused	4.1 ± 5.9	4.9 ± 7.1	4.3 ± 6.6	3.9 ± 5.8	6.0 ± 8.7
Education (yrs)					
2 or less	5.6 ± 6.6	5.8 ± 7.1	5.0 ± 6.2	4.7 ± 6.6	7.5 ± 9.1
3 – 4	4.7 ± 6.4	4.9 ± 7.5	5.7 ± 7.2	6.9 ± 9.0	6.3 ± 8.9
5 – 6	4.6 ± 4.7	4.5 ± 6.3	4.7 ± 7.2	4.6 ± 6.6	4.7 ± 5.7
7 – 10	3.4 ± 5.3	3.5 ± 6.1	4.7 ± 8.2	4.3 ± 7.2	4.8 ± 6.9
11 or more	4.3 ± 6.2	4.6 ± 8.1	3.3 ± 7.1	3.2 ± 4.8	4.9 ± 9.5
Missing/refused	8.2 ± 10.1	4.0 ± 5.8	4.2 ± 5.2	5.7 ± 3.2	5.8 ± 6.1
Occupation					
Farmer	4.9 ± 7.0	4.6 ± 8.0	3.6 ± 5.8	4.1 ± 7.1	4.8 ± 8.1
Seller at home	5.9 ± 5.9	5.4 ± 6.4	5.4 ± 6.7	5.3 ± 7.0	7.1 ± 7.8
Seller at market	6.2 ± 6.9	4.9 ± 5.2	5.1 ± 5.4	5.5 ± 7.5	5.7 ± 7.5
Tailor/seamstress	2.9 ± 3.5	3.8 ± 6.1	5.5 ± 8.3	5.4 ± 7.6	6.0 ± 7.5
Unemployed	4.9 ± 6.5	6.4 ± 8.0	5.4 ± 7.6	4.7 ± 6.5	8.3 ± 10.1
Other	3.7 ± 6.7	3.9 ± 6.9	3.6 ± 7.0	4.1 ± 5.9	4.5 ± 7.7

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Table 29 (Continued).

	Pain days	Depression days	Anxiety days *	Sleepless days	Vitality days
Illness knowledge					
Insect bite	6.8 ± 7.3	9.1 ± 9.9	9.4 ± 9.8	7.4 ± 9.3	7.4 ± 8.5
Magic	6.7 ± 6.7	8.8 ± 8.8	5.5 ± 6.1	6.8 ± 9.3	12.7 ± 11.5
Sprain	3.4 ± 3.1	2.4 ± 2.6	4.6 ± 7.9	1.8 ± 2.7	4.1 ± 4.4
Chill	6.9 ± 6.5	8.2 ± 9.1	5.3 ± 6.7	5.9 ± 6.7	10.9 ± 9.5
Other	9.7 ± 8.9	7.2 ± 8.3	7.1 ± 8.3	7.7 ± 8.8	10.2 ± 10.1
Don't know	6.7 ± 7.1	6.6 ± 8.1	5.9 ± 7.7	5.9 ± 7.5	9.0 ± 10.0
Stage of right leg					
Normal	3.5 ± 4.1	4.3 ± 6.3	3.4 ± 4.0	4.0 ± 4.5	5.2 ± 7.4
Stage 1	5.0 ± 6.6	4.4 ± 7.1	3.8 ± 6.2	4.1 ± 7.2	6.0 ± 8.9
Stage 2	5.4 ± 7.0	5.1 ± 6.2	4.5 ± 5.9	5.0 ± 6.2	5.4 ± 7.0
Stage 3	6.1 ± 7.9	5.8 ± 7.6	7.1 ± 9.4	6.3 ± 7.9	8.7 ± 9.9
Stage 4 or more	4.6 ± 4.9	6.2 ± 7.8	6.8 ± 9.4	5.2 ± 6.9	6.3 ± 8.1
Missing/NA	4.5 ± 4.9	16.0 ± 19.8	12.5 ± 13.4	1.0 ± 1.4	22.5 ± 10.6
Stage of left leg					
Normal	6.1 ± 8.3	7.5 ± 8.0	8.8 ± 9.1	7.0 ± 7.9	8.5 ± 9.8
Stage 1	4.6 ± 5.0	5.0 ± 7.5	3.1 ± 3.7	2.9 ± 5.5	6.8 ± 10.3
Stage 2	5.2 ± 7.2	4.3 ± 6.4	4.3 ± 6.7	4.8 ± 6.6	5.6 ± 7.5
Stage 3	4.3 ± 4.4	4.6 ± 5.6	4.6 ± 6.2	5.9 ± 7.3	5.6 ± 7.4
Stage 4 or more	6.0 ± 4.4	6.2 ± 8.3	6.7 ± 9.1	5.0 ± 7.0	6.5 ± 7.4
Missing/NA	3.0 ± 2.8	16.0 ± 19.8	12.0 ± 14.1	1.0 ± 1.4	19.0 ± 15.6

Table 30. Other Socio-demographic Variables vs. Major Cause of Impairment or Health Problem (Other problem and other2 indicate the sum of the health problems so that the proportion of AL may exceed 1, *: different in activity limitation ($p<0.05$), **: different in personal care ($p<0.05$)).

	Activity limitation (n (%total))	Health problem (n (% per Activity limitation (AL)))				Year of activity limitation (mean ± SD)	Personal care (n (% AL))	Routine care (n (% AL))
		Arthritis	Lymphedema	Other problem	Other2			
Age group (yrs) *								
19 or less	8 (24.2)	6 (75.0)	2 (25.0)	6 (75.0)	7 (87.5)	1.5 ± 1.0	1 (12.5)	3 (37.5)
20 – 29	20 (47.6)	14 (70.0)	9 (45.0)	13 (65.0)	9 (45.0)	2.9 ± 3.9	2 (10.0)	5 (25.0)
30 – 39	22 (44.9)	19 (86.4)	6 (27.3)	11 (50.0)	8 (36.4)	3.7 ± 5.1	4 (13.6)	8 (36.4)
40 – 49	32 (50.0)	18 (56.3)	17 (53.1)	30 (93.8)	17 (53.1)	8.2 ± 11.0	10 (31.3)	13 (40.6)
50 – 59	28 (53.8)	22 (78.6)	19 (67.9)	16 (57.1)	27 (96.4)	7.8 ± 9.5	8 (28.6)	12 (42.9)
60 – 69	24 (61.5)	20 (83.3)	14 (58.3)	14 (58.3)	17 (70.8)	8.3 ± 13.4	7 (29.2)	12 (50.0)
70 or more	28 (82.4)	23 (82.1)	16 (57.1)	31 (110.7)	27 (96.4)	4.2 ± 5.9	8 (28.6)	20 (71.4)
Missing/refused	1 (33.3)	0 (0)	1 (100.0)	0 (0)	0 (0)	1.0 ± 0.0	0 (0)	0 (0)
Age of onset (yrs) *								
9 or less	3 (20.0)	3 (100.0)	1 (33.3)	2 (66.7)	1 (33.3)	6.7 ± 7.0	0 (0)	0 (0)
10 – 19	39 (42.4)	25 (64.1)	23 (59.0)	29 (74.4)	23 (59.0)	8.6 ± 12.9	9 (23.1)	16 (41.0)
20 – 29	32 (55.2)	25 (78.1)	18 (56.3)	23 (71.9)	28 (87.5)	7.0 ± 10.1	8 (25.0)	16 (50.0)
30 – 39	20 (39.2)	14 (70.0)	10 (50.0)	15 (75.0)	9 (45.0)	6.6 ± 7.6	5 (25.0)	8 (40.0)
40 – 49	22 (64.7)	16 (72.7)	6 (27.3)	16 (72.7)	18 (81.8)	2.6 ± 3.1	5 (22.7)	10 (45.5)
50 or more	21 (72.4)	19 (90.5)	10 (47.6)	18 (85.7)	15 (71.4)	4.1 ± 5.4	3 (14.3)	9 (42.9)
Missing/refused	26 (70.3)	20 (76.9)	16 (61.5)	18 (69.2)	18 (69.2)	3.4 ± 5.7	9 (34.6)	14 (53.9)

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Table 30 (Continued).

	Activity limitation (n (% total))	Health problem (n (% per Activity limitation (AL)))				Year of activity limitation (mean ± SD)	Personal care (n (% AL))	Routine care (n (% AL))
		Arthritis	Lymphedema	Other problem	Other2			
Education (yrs) * **								
2 or less	99 (63.1)	72 (72.7)	57 (57.6)	79 (79.8)	73 (73.7)	6.5 ± 10.1	33 (33.3)	50 (50.5)
3 – 4	17 (51.5)	14 (82.4)	10 (58.9)	8 (47.1)	14 (82.4)	7.1 ± 10.2	3 (17.7)	9 (52.9)
5 – 6	18 (45.0)	11 (61.1)	8 (44.4)	18 (100.0)	10 (55.6)	5.2 ± 7.6	1 (5.6)	3 (16.7)
7 – 10	12 (30.0)	11 (91.7)	3 (25.0)	6 (50.0)	6 (50.0)	1.8 ± 2.0	2 (16.7)	5 (45.5)
11 or more	13 (35.1)	11 (84.6)	6 (46.2)	10 (76.9)	10 (76.9)	3.9 ± 3.0	0 (0)	4 (30.8)
Missing/refused	4 (44.4)	4 (100.0)	0 (0)	0 (0)	1 (25.0)	6.5 ± 5.9	0 (0)	2 (50.0)
Occupation *								
Farmer	20 (45.5)	13 (65.0)	12 (60.0)	15 (75.0)	11 (55.0)	7.0 ± 11.3	6 (30.0)	7 (35.0)
Seller at home	42 (63.6)	34 (81.0)	23 (54.8)	30 (71.4)	32 (76.2)	6.1 ± 8.6	10 (24.4)	18 (42.9)
Seller at market	26 (50.0)	19 (73.1)	15 (57.7)	12 (46.2)	16 (61.5)	6.2 ± 8.0	4 (15.4)	12 (46.2)
Tailor/seamstress	6 (35.3)	6 (100.0)	3 (50.0)	5 (83.3)	4 (66.7)	5.0 ± 5.3	1 (16.7)	1 (16.7)
Unemployed	62 (68.9)	43 (69.4)	30 (48.4)	59 (95.2)	55 (88.7)	5.6 ± 9.0	14 (22.6)	32 (51.6)
Other	18 (28.1)	16 (88.9)	7 (38.9)	8 (44.4)	5 (27.8)	4.1 ± 8.3	5 (27.8)	8 (44.4)
Illness knowledge								
Insect bite	17 (54.8)	12 (70.6)	8 (47.1)	15 (88.2)	15 (88.2)	5.6 ± 6.9	5 (29.4)	10 (58.8)
Magic	13 (39.4)	9 (69.2)	9 (69.2)	12 (92.3)	15 (115.4)	4.5 ± 5.6	3 (23.1)	6 (46.2)
Sprain	13 (48.2)	9 (69.2)	8 (61.5)	18 (138.5)	11 (84.6)	10.1 ± 9.7	3 (23.1)	3 (23.1)
Chill	27 (62.8)	21 (77.8)	19 (70.4)	17 (63.0)	11 (40.7)	4.9 ± 10.9	7 (25.9)	14 (51.9)
Other	21 (51.2)	19 (90.5)	14 (66.7)	16 (76.2)	17 (81.0)	4.3 ± 9.9	8 (38.1)	10 (47.6)
Don't know	94 (53.1)	69 (73.4)	40 (42.6)	69 (73.4)	68 (72.3)	5.5 ± 8.4	18 (19.1)	39 (41.5)

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Table 30 (Continued).

	Activity limitation (n (% total))	Health problem (n (% per Activity limitation (AL)))				Year of activity limitation (mean ± SD)	Personal care (n (% AL))	Routine care (n (% AL))
		Arthritis	Lymphedema	Other problem	Other2			
Daily income (gde)								
25 or less	17 (51.5)	9 (52.9)	8 (47.1)	17 (100.0)	10 (58.9)	5.2 ± 7.9	1 (5.9)	4 (23.5)
26 – 50	15 (53.6)	12 (80.0)	12 (80.0)	9 (60.0)	11 (73.3)	10.8 ± 13.0	5 (33.3)	5 (33.3)
51 – 100	11 (37.9)	11 (100.0)	8 (72.7)	11 (100.0)	16 (145.5)	4.4 ± 4.9	2 (18.2)	5 (45.5)
101 – 200	15 (60.0)	13 (86.7)	6 (40.0)	1 (6.7)	4 (26.7)	5.5 ± 11.4	5 (33.3)	8 (53.3)
201 – 400	15 (51.7)	12 (80.0)	6 (40.0)	12 (80.0)	2 (13.3)	2.4 ± 5.4	3 (20.0)	7 (46.7)
401 or more	11 (39.3)	10 (90.1)	6 (54.5)	9 (81.8)	6 (54.5)	2.8 ± 5.4	3 (27.3)	6 (54.5)
Missing/refused	79 (54.9)	55 (69.6)	38 (48.1)	62 (78.5)	63 (79.7)	6.3 ± 8.9	20 (25.3)	38 (48.1)
Stage of right leg *								
Normal	12 (27.9)	9 (75.0)	4 (33.3)	6 (50.0)	5 (41.7)	2.9 ± 4.2	2 (16.7)	6 (50.0)
Stage 1	56 (52.8)	39 (69.6)	27 (48.2)	46 (82.1)	43 (76.8)	4.5 ± 7.8	11 (20.4)	17 (30.4)
Stage 2	46 (54.8)	34 (73.9)	26 (56.5)	28 (60.9)	24 (52.2)	6.4 ± 9.9	14 (30.4)	24 (52.2)
Stage 3	30 (57.7)	23 (76.7)	18 (60.0)	27 (90.0)	23 (76.7)	5.9 ± 7.2	5 (16.7)	16 (53.3)
Stage 4 or more	17 (58.6)	16 (94.1)	9 (52.9)	8 (47.1)	12 (70.6)	10.6 ± 14.2	6 (37.5)	9 (56.3)
Missing/NA	2 (100.0)	1 (50.0)	0 (0)	6 (300.0)	5 (250.0)	6.5 ± 4.9	1 (50.0)	1 (50.0)
Stage of left leg **								
Normal	12 (46.2)	8 (66.7)	3 (25.0)	13 (108.3)	11 (91.7)	4.5 ± 5.8	0 (0)	5 (41.7)
Stage 1	35 (49.3)	26 (74.3)	13 (37.1)	31 (88.6)	17 (48.6)	5.8 ± 9.9	4 (11.8)	12 (34.3)
Stage 2	63 (50.4)	48 (76.2)	38 (60.3)	46 (73.0)	45 (71.4)	5.7 ± 9.5	21 (34.4)	27 (42.9)
Stage 3	32 (55.2)	25 (78.1)	21 (65.6)	16 (50.0)	21 (65.6)	6.8 ± 9.7	6 (18.8)	19 (59.4)
Stage 4 or more	19 (55.9)	15 (78.9)	8 (42.1)	11 (57.9)	17 (89.5)	5.7 ± 6.7	6 (31.6)	8 (44.5)
Missing/NA	2 (100.0)	0 (0)	1 (50.0)	4 (200.0)	1 (50.0)	3.5 ± 0.7	2 (100.0)	2 (100.0)

Reliability and Validity

The last research question, reliability and validity of the standardized instruments, is an important issue for lymphedema management in the Haitian context. Table 31 shows the results of internal consistency reliability for the QOL instruments (EuroQol, CDC Healthy Days) and a subjective well-being assessment tool (CES-D). Prior to the analysis, the scores of EQ-VAS were reversed because EQ-VAS had a negative direction in relation to the items in EQ-5D. Some questions in CDC Healthy Days were excluded due to the non-directional measurements (e.g., major cause of impairment or health problem). Also, all missing values and ambiguous responses were ignored prior to calculation. Overall, all measurements have at least acceptable inter-rater reliability (alpha > 0.70).

Table 31. Internal Consistency Reliability in QOL Scales and CES-D.

	N	Cronbach coefficient alpha
EuroQol	306	0.72
CES-D	280	0.85
CDC Healthy Days	281	0.87
Core questions only	298	0.71

In order to examine the criterion-related validity, the results of three scales were compared by correlational analysis. Correlational analysis was also used for the analysis of convergent and discriminant validity. Table 32 shows the results of validity analyses. The rows consist of the appropriate CDC Healthy Days health topics, while the columns correspond to the EuroQol five-dimensioned health categories. The CES-D score was added in both rows and columns for convenience. For criterion-related validity, EuroQol

questionnaires were fairly associated with CDC Healthy Days. Particularly, five health dimensions (*mobility, self-care, usual activities, pain/discomfort, anxiety/depression*) in EuroQol were strongly associated with CDC Healthy Days self-rated health condition (all $p<0.01$), and three core health questionnaires (*physically unhealthy days, mentally unhealthy days, activity limitation days*) in CDC Healthy Days were also significantly associated with EuroQol overall healthy status (all $p<0.01$). Likewise, EuroQol agreed with CDC Healthy Days in terms of physical health, activity limitation, and overall/general health status (all $p<0.05$), and disagreed with each other in the other discordant domains. These outcomes indicate satisfactory convergent and discriminant validity. However, the mental health indicators in EuroQol had non-significant, weak relationships with those of both CES-D and CDC Healthy Days, even though the other two forms had slightly less strong but statistically significant relationships.

Table 32. Correlations between Representative Questions in QOL Instruments and CES-D (*: p<0.05, **: p<0.01).

	Mobility	Self-care	Usual activities	Pain / discomfort	Anxiety / depression	Overall health	CES-D
CES_D	0.12 *	0.12	0.15 **	-0.08	0.01	- 0.15 **	-
Self-rated health	0.26 **	0.25 **	0.32 **	0.28 **	0.19 **	0.57 **	0.20 **
Physically unhealthy days	0.10	-0.00	0.11 *	0.14 *	0.13 *	0.28 **	0.08
Mentally unhealthy days	0.05	-0.01	0.13 *	0.05	0.07	0.21 **	0.24 **
Activity limitation (AL) days	0.10	0.07	0.14 *	0.13 *	0.18 **	0.21 **	0.10
Any AL	-0.30 **	-0.04	-0.35 **	-0.27 **	-0.16 **	- 0.41 **	-0.12 *
Length of AL	0.02	0.24 **	0.15	-0.10	0.07	- 0.04	0.45 **
Personal care for AL	-0.26 **	-0.31 **	-0.36 **	-0.26 **	-0.17 *	- 0.02	0.09
Routine care for AL	-0.31 **	-0.16 *	-0.29 **	-0.25 **	-0.10	- 0.05	0.01
Pain days	0.06	0.03	0.03	0.12 *	0.14 *	0.26 **	0.01
Depression days	0.15 **	0.00	0.12 *	0.07	0.07	0.18 **	0.21 **
Anxiety days	0.17 **	0.03	0.09	0.11 *	0.06	0.10	0.19 **

Chapter Five

Discussion and Conclusion

Morbidity control of lymphatic filariasis is one of the most important public health issues in Haiti. In order to increase QOL among Haitian lymphedema patients due to LF as well as contribute to eradicate LF worldwide, it is critical to implement appropriate control strategies in endemic areas. This thesis aimed to observe the association among filariasis-related variables among lymphedema patients in three rural Haitian towns and assess QOL among affected persons by using established QOL instruments. Particularly, attention was given to gender differences in the impact of the disease on people's daily lives. There were numerous significant findings in the results of data analysis.

Regional Differences

In general characteristics of lymphedema patients, there are significant differences among the three communities, Arcahaie, Cabaret, and La Plaine. Though lymphedema conditions in Arcahaie are very similar to those in Cabaret, people in La Plaine experienced more severe symptoms than in other areas. Although sample characteristics are slightly different among regions, the results confirm the finding by Dreyer et al. (1998) that the characteristics of filariasis vary by geographic region.

Regional differences are more obvious for illness history. No consistent

symptomatic conditions were observed among towns. Although the interview relied on patients' recall, there were significant differences among the three communities in the first impression of the illness and the first symptom noticed. This different illness history might influence perception and knowledge of the disease and future prevention, treatment, and control. In particular, since lymphedema treatment requires sustained intensive efforts, it is critical to understand the background and perception of the disease prior to introducing the prevention and treatment regimen at the local level. For example, people in La Plaine were more likely to utilize health services and routine health care practices. This is likely explained by the greater accessibility to the capital. Since there are many medical services available in Port-au-Prince and its suburbs in comparison with other cities, residents in La Plaine tend to talk to health professionals more often. Overall, they were more concerned about leg treatment and took care of their legs more frequently with confidence. Particularly, they reported washing legs, use of massage, and avoiding walking on bare feet more often than people in the other zones. Maintaining hygiene is one of the most critical practices for LF morbidity control. Therefore, considering these facts, the introduction of a morbidity control program in La Plaine would likely be received well. On the other hand, people in Arcahaie seem more conservative regarding leg treatments. More people prefer to visit a traditional healer and use herbal remedies. Their knowledge of the illness is more related to traditional cultural and spiritual dimensions. However, though knowledge of the illness is a fundamental key to the future prevention of the disease, the results reflect poor understanding of the disease nationwide (Coreil et al., 1998; Eberhard et al., 1996). Therefore, it would be effective to plan and implement morbidity control regimens on a regional basis.

Gender Perspective

The sample design was based on non-probability sampling, but the gender proportion was consistent with previous findings. In Haiti, women suffer from lymphedema 5 – 10 times more often than men (Lammie et al., 1993), and there were 4.2 times more females than males in the sample so that the gender comparison in this thesis can be representative of the general lymphedema conditions in Haiti. However, overall gender differences were less pronounced than regional variation. Significant gender differences were found in aspects of acute attacks, but there was no statistically significant discordance in illness history or knowledge of the illness. Therefore, in terms of lymphedema, gender differences can be accorded comparatively low priority in these Haitian towns.

Lymphedema Condition and Its Related Variables

The lymphedema conditions among people in three Haitian communities are consistent with the previous findings in other countries. Dreyer et al. (2002) mention that many lymphedema cases fall within stage 3 or less, which indicates shallow skin folds or swollen legs. In three towns, nearly two-thirds of people were diagnosed as falling within the first two stages, and about 90 % were in the first three stages. More severe conditions were found among people in La Plaine. Because the area of La Plaine experiences frequent flooding, residents are more likely to be exposes to mosquito-favorable environments.

However, the differences across towns were not significant. These results are also similar to findings in another Haitian town, Leogane (Dahl, 2001). Therefore, the conditions of lymphedema in these towns appear to reflect a general lymphedema profile.

Socio-demographic variables had a partial association with lymphedema conditions. In this analysis, age group was strongly associated with lymphedema characteristics. In both foot size and stage of the illness, lymphedema conditions worsened as people became older, with a peak around age 50. This supports the relationship between age and lymphedema conditions in numerous studies from other parts of the world (Gasarasi et al., 2000; Gyapong et al., 1996b; Hyma et al., 1989; King & Freedman, 2001; Shriram et al., 2002; Weerasooriya et al., 2001). In contrast, other variables of interest such as gender, SES (occupation, income, and education), knowledge of the illness, and history of acute attacks were poorly associated with lymphedema conditions. This is probably due to the type of study design, a cross-sectional study, which makes it difficult to establish a causal relationship due to the collection of data at a single point in time. In the LF literature, these variables may be the potential indicators of the lymphedema conditions more or less. Therefore, in order to find out the clear relationship, it would be necessary to conduct more thorough and prospective research in the future.

Health-related Behavior

Health-related behaviors are critical in establishing an effective preventive and control strategy for LF. In this thesis, health-related behaviors were assessed as seeking care for leg treatment, taking precautions with one's legs, self-care practices for legs which

are currently done or can be done in the future, and confidence in leg care (self-efficacy). The proportion of people who indicated choosing herbal remedies for treatment and engaging in self-care practices is substantially high. Although no scientific benefit of herbal remedies is known for lymphedema, more than 40 % of people usually use them for their treatment and self-care practices. This suggests that traditional therapy for LF is still common and widespread in the study setting. However, Western medicine is reported as an alternative choice. Seeing health professionals and purchasing pharmaceutical medicine are practiced in the communities, although availability is still limited due to the small rural community far from the capital and the prohibitive cost of medicine. In addition, regional differences are evident. Traditional medicine is more widely practiced in Arcahaie, but Western medicine is more common in La Plaine, probably due to the higher accessibility to the metropolitan area. Also, the confidence of self-care practice for legs is significantly different among towns. More people in La Plaine are very confident in their leg care. Therefore, since the treatment and prevention strategy of lymphedema is generally based on the Western regimen, the regional characteristics of health-related behaviors would influence acceptability of future interventions.

Socio-demographic variables rather than the regional perspective appear to be less important determinants of health-related behaviors. Gender, age group, age of onset, income, and occupation were not significantly associated with current or future self-care for legs or self-efficacy. Only educational level and knowledge of the illness were related to future possible self-care practice. However, knowledge of the illness was quite low so that it would be possible to promote self-care practices by improving illness knowledge. Reports from other countries indicate that poor LF knowledge significantly contributes to

high risk behaviors as well as exacerbates the disease (Ahorlu et al., 1999; Eberhard et al., 1996; Gyapong et al., 1996a; Rauyajin et al., 1995). Therefore, assessment of the effect of health education about LF would be beneficial for future morbidity control strategies.

Quality of Life and Subjective Well-being Scales

Reliability and Validity

The other noteworthy finding of the research is the successful introduction of the QOL instruments for evaluation of the impact of lymphedema on people's lives. Since there has been little focused research to assess QOL in LF populations, two different QOL measurements (EuroQol and CDC Healthy Days) and the CES-D as a mental health indicator were used in Haitian lymphedema cases. Reliability of the instruments was established. Since the instruments are considered reliable when the internal consistency coefficient or Cronbach alpha falls at 0.70 or above, and all the instruments reached at least 0.71 or more. This indicates that the scales are able to measure a consistent aspect of LF in Haiti.

In contrast, it is usually more difficult to demonstrate the cross-cultural validity of instruments. In this thesis, criterion-related validity and construct validity were assessed. Criterion-related validity was acceptable but not really strong. The health domain in the EuroQol was correlated with similar outcomes in the CDC Healthy Days, except for mental health indicators. In particular, overall health status in the EuroQol was strongly associated with self-rated health status in the CDC Healthy Days scale. The other health domains also showed similar results in both questionnaires. However, mental health

indicators were poorly associated with QOL measures. Particularly, the EuroQol mental health domain (anxiety/depression) was problematic, probably due to the simplicity of the questionnaires. On the other hand, the CDC Healthy Days instrument has a few items regarding mental health, and the CES-D is entirely focused on mental health assessment. Scores for the two instruments were significantly correlated. Therefore, both the EuroQol and CDC Healthy Days would be acceptable for evaluating lymphedema conditions, but in terms of mental health, CDC Healthy Days would provide a more valid tool.

On the other hand, construct validity established more reasonable evidence for validity of the instruments. Dahl (2001) reported that lymphedema patients in Haiti experienced limited physical activities due to acute attacks. Nearly 95 % of respondents had acute attacks in the previous year, and more than 50 % of them reported activity limitations especially due to arthritis and lymphedema in the CDC Healthy Days instrument. Bandyopadhyay (1996) and Coreil et al. (1998) indicate that women with abnormal physical features due to lymphedema experience mental and psychological stress. Although no gender differences were found in mental health indicators in any of the QOL instruments, respondents in La Plaine, where there are 6.8 times more females than males in the sample, showed significantly worse mental health scores in two of three instruments. Thus, construct validity is somewhat demonstrated.

Related to construct validity, convergent and discriminant validity were also assessed. The results showed that the multiple health indicators in different domains could operate consistently at least at acceptable levels, except for the mental health indicators mentioned in criterion-related validity. Although the correlation coefficients among convergent domains are slightly lower that expected, most of the matched pairs indicated a

significant relationship between them. Likewise, most of discriminant pairs showed no significant relationship. Therefore, the QOL instruments are fairly applicable in assessing lymphedema patients in Haiti, but further investigation would be beneficial.

Outcome of the Scales vs. Socio-demographic Variables

The results of QOL instruments show significant relationships with socio-demographic variables. Like lymphedema conditions and health-related behaviors, regional differences are strongly associated with the results of QOL instruments. Though the significant relationship between towns and EuroQol mental health indicators is questionable due to poor validity of the instrument discussed above, the relationship in CES-D and CDC Healthy Days is significant. In the CES-D, those in La Plaine experienced significantly more severe mental health symptoms than the other areas, and a similar tendency was observed in the CDC Healthy Days scores. Particularly, the outcomes in CDC Healthy Days indicate apparent regional differences between La Plaine and the other towns for the other health domains. Also, both EuroQol and CDC's general health condition indicators showed significant differences among these three towns.

Other socio-demographic variables were also associated with QOL outcomes. The most significant relationship was found with age. As in general healthy populations, physical health conditions including activity limitations are strongly correlated with age. As the age of the patients increases, the scores for physical health conditions and activity limitations in EuroQol and CDC Healthy Days showed a negative relationship. Noteworthy, the tendency was most obvious in usual activities, pain/discomfort, and overall health

status in EuroQol, and overall health status and activity limitation in CDC Healthy Days. Some other mental health indicators are also associated with age group, but the results are inconsistent. Thus, age would be a potential indicator of health status among lymphedema patients.

Additional variables such as age of onset, educational level, occupation, and knowledge and stage of the illness were also potential indicators of health status, but the results were variable. Though gender, income, and knowledge of the illness seem to be less important to evaluate health conditions among lymphedema patients, age of onset, educational level, and occupation were significantly associated with indicators of physical health and activity limitations. In age of onset, for example, those who had the first symptom in early life seem to have better health status and less activity limitation. Similarly, as people complete higher education, their health status and activity limitation appear to be better. Regarding occupation, unemployed people are more likely to have poor health status and more activity limitation. Though it is difficult to identify which type of occupation influences health status probably due to the imbalanced sample among job categories, tailor/seamstress seems to be healthier than others.

Stage of the illness is another variable associated with QOL outcomes. In addition to the relationship with physical health and activity limitation, stage of the illness seems to be a good mental health indicator among lymphedema patients. In both CES-D and CDC Healthy Days, there were significant differences in scores across the stage levels. However, there is no tendency that people at higher stages of the illness have worse mental health conditions than those at lower. The results indicate that people with normal leg conditions had very poor mental health status, similar to stage 4 or more. This might imply that their

mental health is influenced by additional factors in their lives. Although the condition of lymphedema may be associated with mental health, there is poor control of possible confounders due to the characteristics of the study. Thus, further investigation would be valuable.

Overall, the generic QOL instruments were useful in evaluating the health conditions among lymphedema patients. Without the analysis of QOL, it was found that only regional differences and age groups were significant determinants. However, by analyzing the results of QOL instruments, other socio-demographic variables appeared to be potential correlates of lymphedema patients' health, especially physical health and activity limitation. Though no comparison with people who have normal health status was made, the results of the QOL instruments suggest it would be beneficial to look at such a comparison group. That additional information would help design effective prevention, treatment, and morbidity control strategies.

Limitation

There are several limitations on this research. The first one is the sampling method. Since non-probability sampling was chosen, there are possible biases in sample characteristics. The common one is selection bias. Since it was difficult to select a member of the study group probabilistically, the possibility of sample misrepresentation was unable to be excluded throughout the study. Particularly, in comparison with estimated total population in each community, the area of La Plaine might be overrepresentative in the sample. However, sample characteristics in this thesis were more likely to be very similar

to previous studies (eg. Eberhard et al., 1996; Lammie et al., 1993), even though several minor disparities such as gender ratio among three towns might have skewed the outcomes and their interpretation. Other limitations due to non-probability sampling are susceptibility to confounding and weak external validity. Due to the inability of randomization, it might be difficult to rule out potential explanations and generalize the results to and/or across communities. Therefore, since population characteristics were unavailable in these regions, further studies will need to support the findings in this study.

Also, regarding the data collection, interviewer bias might be a critical factor. Since the data were collected by five trained interviewers in three different locations in a short period of time, there were some discrepancies in the dataset and deviation from the protocol of data collection. Particularly, the faulty administration of one of CDC Healthy Days questionnaires made it difficult to follow the guidelines of the analysis and made the outcomes less useful. Therefore, careful attention to the data collecting process is essential.

The second limitation stems from the purpose of the dataset. The data came from an ongoing project called Evaluation of Support Groups in the Management of Lymphedema Caused by Lymphatic Filariasis. Although this thesis is aimed at the description of lymphedema conditions in new areas of Haiti, the dataset has already been designed as a baseline survey for evaluating a planned support group intervention. This is appropriate for the preparation and introduction of morbidity control in the study community, but some important variables might be excluded for the purpose of the description of general filariasis conditions. In order to obtain more universal information in the new areas, it would be necessary to conduct the primary data collection at the neutral position.

The third limitation is the method of analysis. The purpose of the data analysis was

descriptive rather than analytical so that the socio-demographic variables were analyzed one by one. This thesis concluded that the gender difference seemed to be less important, but no gender variation within three different towns was examined. Also, other variables which had no association with lymphedema conditions might be potential confounders. Thus, more complex analyses such as multiple regression analysis would be required for deeper analysis. In this thesis, however, data collection was at a single point of time so it is difficult to determine the causal relationships between variables. Therefore, the results of this thesis can be viewed as a preliminary assessment of QOL among lymphedema patients in Haiti.

Conclusion

Lymphedema conditions due to LF in three rural towns in Haiti are explained by several interesting variables. Regional variation was noteworthy. Generally, people in La Plaine reported more severe symptoms than those in other communities. This was indicated by foot examination and scores on the QOL instruments. Particularly, physical health status and activity limitation were significantly different among towns. Also, health-related behaviors varied across communities. Traditional medicine was more common in Arcahaie, and use of Western medicine was higher in La Plaine. These findings should help design a culturally competent morbidity control strategy at the local level. Likewise, age is an important aspect of public health interventions among lymphedema patients, especially in the treatment of legs. Other variables might be potential indicators for lymphedema control, but their effects seem to be limited. Thus, further investigation

would be valuable.

Lastly, the standardized QOL instruments are useful tools to evaluate health conditions among lymphedema patients. They showed the influence of the socio-demographic variables on the health conditions among patients, particularly on physical health condition and activity limitation. Mental health condition seems to be less important, but additional study would be helpful. The reliability and validity of the instruments in this population are acceptable. Though more careful attention to validity of the EuroQol mental health indicators is needed, general applications of the instruments for lymphedema patients are appropriate. Thus, the information obtained in this research will contribute to the development of morbidity control programs in these areas.

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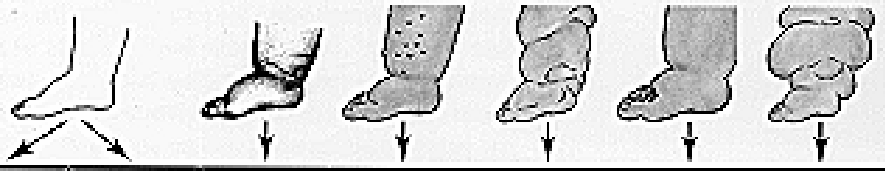
Appendices

Appendix A: Lymphedema Stages (Dreyer et al., 2002).

LYMPHOEDEMA MANAGEMENT, BY STAGE



Treatment Component	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
Hygiene (washing and drying)	Yes (ideally at night)	Yes (ideally at night)	Yes (ideally at night)	Yes (ideally at night)	Yes (twice a day if possible)	Yes (twice a day if possible)	Yes (twice a day if possible)
Care of entry lesions	If present	If present	If present	If present	If present	If present	If present
Exercise	Yes	Yes	Yes	Yes	If possible	If possible	If possible
Elevation	Usually not necessary	At night	Day and night	Day and night	Day and night	Day and night if possible	Day and night if possible
Prophylactic creams	No	No	Usually not necessary	Usually not necessary	Usually necessary	Necessary	Necessary
Prophylactic systemic antibiotics (send to doctor)	No	No	No	Usually not necessary	Usually necessary (if acute attacks persist)	Necessary	Necessary
Cosmetic surgery	Not applicable	Not applicable	Not applicable	If medically indicated	If medically indicated	If medically indicated	If medically indicated

Appendix B: Filariasis Baseline Evaluation Survey – Arcahaie.

Anket de Baz Pou Filaryoz – Akaye

(Filariasis Baseline Evaluation Survey – Arcahaie)

Dat anket la (Date of survey) _____2003

Nom ankete a (Name of interviewer) _____

Nom enfomate a (Name of respondent) _____

Eske-w kann vizite *Klinik Gwopye* ***nan l'Hôpital Ste. Croix déjà? Wi Non (si Wi, pa ranpli kesyonè a)***

Demografik (Demographics)

Lokalite (address)_____

Sex (Gender) Fiy (Female) _____ Gason (Male) _____

Ki laj ou? (How old are you?) _____

Eske ou marye/plase/ etc.? (Are you married/co-habiting, etc.?) _____
[1– marye 2– plase 3– viv avek 4– renmen 5– fyanse 6– selibate 7– separe ou divose 98– Lot, di kisa]

[1- married 2- plase 3-live together 4- in relationship 5- engaged 6- single 7- separated or divorced 98- Other, explain]

Kombyen pitit you gen kap viv kounye a (How many living children do you have?) _____

Ki laj premye la genyen? ____ ans
(How old is the oldest child?)

Ki laj denye la genyen? ____ans
(How old is the youngest child?)

Kombyen petit ale lekol? _____ (How many of your children go/went to school?)

Nan ki relijon ou mache (What is your religion?) _____
[1- katolik 2- protestan 3- vodouyizan 4- pa gen relijon 98- lot, di kisa]
[1- Catholic 2- Protestant 3- Voudouiste 4- No religion 5- Other, explain]

Kisa ou ap fe pou viv/ki metye ou genyen? _____

(What do you do for a living/what is your occupation?)

[1- kiltivate 2- komesan nan lakay 3 - komesan nan marche 4 - Couture 5 - Lot travay 6 - Pa gen travay 98- Lot, di kisa]
[1- farmer 2- seller at home 3 – seller at market 4 – tailor/ seamstress 5- Other work 4- Unemployed 98- Other, explain]

Normalman, kombyen jou ou travay nan seman? _____ jou pa semane

Kombyen kòb ou kabap fè? _____ Gdes o pa jou o pa semane o pa mwa

Kombyen ane ou te fe nan lekol? _____
[How many years of school did you complete?]

Eske ou konn li ak ekri? (Can you read and write?) wi (Y) _____ non (N) _____

Eske genyen nan kay la? (Do you have the following in your house?)

Radyo (radio) _____ Office/china/gade manje/armoire (Storage chest) _____

Salon (living room) _____ Bicyclette/motocyclette (Bicycle/motor cycle) _____

Istwa de maladi (Illness history)

Ki laj ou te genyen le ou te premye santi maladi ya? _____
(What age were you when you first became aware of the illness?)

Kisa ou ta panse ou te genyen? _____
(What did you think you had?)

1-Fredite 2- Ekzema 3-Glan 4- Poud maji 5- Piki insek 6-Ansent 7- Antoch 8- Yon maladi 9- Gwopye 10- Filariose 11- Pakonnen 12- Lot bagay, di kisa

(1-Chill 2- Eczema 3- Gland 4- Magical powder 5- Insect bite 6- Pregnancy 7- Sprain 8- An illness 9- Big foot 10- Filariasis 11- Don't know 12- Other, explain)

Ki premye sintom ou te remake pou maladi sa a? 1- pye a anfle 2- doule 3- glann 4 - fyev

5 - tet fe mal 6 - pye a cho 7- Lot, di kisa

_____

(What was the first symptom you noticed? 1- foot swollen 2- pain 3- swollen gland 4 - fever 5 - headache
6 - foot hot 7- Other, explain)

Kisa ou te fe pou jwenn soulajman? Eksplike nou sa. 1- Kay ougan 2- Remed fey

3- pommade 4- mete med fey 5- Tikwi/Sansi 6- Mete glacé 7- Medicaman

famasi 8- Lot bagay, di kisa _____

(What did you do to treat the illness? 1- Traditional healer 2- Herbal remedy 3- Pommade 4- Herbal leaves on leg 5- Cupping/leeches 6- put ice on leg 7- Pharmaceutical medicine 8- Other, explain)

Kijan de prekosyon ou pran ak pye ou? Di mwen tou sa ou fe pou li. _____
_____
(What precautions do you take with your foot? Tell me everything you do for it.)

Eske ou konn ki sa atak la-ye? Eske ou kapab di'm, s'il vous plait. (Pa bezwen ekrit anyen)

Anné ki sot pase, konbyen atak ou te genyen? _____
(During the past year, how many acute attacks did you have?)

	Atak #1	Atak #2	Atak #3
Nan ki mwa ou te genyen atak-sa?	**Mwa _____**	**Mwa _____**	**Mwa _____**
Konbyen jou atak-sa te dire?	**_____ Jou**	**_____ Jou**	**_____ Jou**
Eske gen kote ou te ale pou jwenn tretman? **Di ki kote ou te ale.**	**O Klinik _____** **O Kay Medsen Fey _____** **O Kay Ougan _____** **O Ajan de Sante _____** **O Lot kote, di ki kote _____** **O Okenn kote**	**O Klinik _____** **O Kay Medsen Fey _____** **O Kay Ougan _____** **O Ajan de Sante _____** **O Lot kote, di ki kote _____** **O Okenn kote**	**O Klinik _____** **O Kay Medsen Fey _____** **O Kay Ougan _____** **O Ajan de Sante _____** **O Lot kote, di ki kote _____** **O Okenn kote**
Kombyen jou ou te tan avan ale la? Pou ki sa?	**____ Jou** **O Mwen pa't tan** **O P'at gen kòb**	**____ Jou** **O Mwen pa't tan** **O P'at gen kòb**	**____ Jou** **O Mwen pa't tan** **O P'at gen kòb**

Appendix B: (Continued)

Si ou pa't ale okenn kote, pou ki sa?	**O Malade – p'at kapab soti** **O Pa renmen tretman** **O Pa bezwen ale – mwen ka fè tretman lakay mwen** **O Lot _____**	**O Malade – p'at kapab soti** **O Pa renmen tretman** **O Pa bezwen ale – mwen ka fè tretman lakay mwen** **O Lot _____**	**O Malade – p'at kapab soti** **O Pa renmen tretman** **O Pa bezwen ale – mwen ka fè tretman lakay mwen** **O Lot _____**

Appendix B: (Continued)

Kombyen fwa ou te ale la pou meme atak?	**_____ Fwa**	**_____ Fwa**	**_____ Fwa**
Eske moun'n konn ale ak ou?	**O Non O Wi** **Si *Wi,* ki moun?** **_____** **Kijan de travay li fe?** **_____**	**O Non O Wi** **Si *Wi,* ki moun? _____** **Kijan de travay li fe?** **_____**	**O Non O Wi** **Si *Wi,* ki moun?** **_____** **Kijan de travay li fe?** **_____**
	Atak #1	Atak #2	Atak #3
Kombyen tan wap pran pou kabap rive la?	**_____ Minutes**	**_____ Minutes**	**_____ Minutes**
Eske ou te bezwen peye transportasyon pou ale la?	O **Non O Wi** **Si *wi,* $ _____ Gdes chak moun**	O **Non O Wi** **Si *wi,* $ _____ Gdes chak moun**	O **Non O Wi** **Si *wi,* $ _____ Gdes chak moun**
Kijan de tretman ou te jwenn nan lokalite-sa? **Di kombyen kòb ou te peye pou chak tretman ou te**	**O Piki, $ _____ Gdes** **O Medikaman, $ _____ Gdes** **Ki medikaman?** **_____**	**O Piki, $ _____ Gdes** **O Medikaman, $ _____ Gdes** **Ki medikaman? _____**	**O Piki, $ _____ Gdes** **O Medikaman, $ _____ Gdes** **Ki medikaman?** **_____**

jwenn.	**O Med fey, $ _____ Gdes** **O Tikwi/ Sansi, $ _____ Gdes** **O Pommade, $ _____ Gdes** **O Mesaj, $ ______ Gdes** **O Bandaj, $ ______ Gdes** **O Tès, $ ______ Gdes** **Ki tès? ________________** **O Lot, di ki sa ______________**	**O Med fey, $ _____ Gdes** **O Tikwi/ Sansi, $ _____ Gdes** **O Pommade, $ _____ Gdes** **O Mesaj, $ ______ Gdes** **O Bandaj, $ ______ Gdes** **O Tès, $ ______ Gdes** **Ki tès? ________________** **O Lot, di ki sa _______________**	**O Med fey, $ _____ Gdes** **O Tikwi/ Sansi, $ _____ Gdes** **O Pommade, $ _____ Gdes** **O Mesaj, $ ______ Gdes** **O Bandaj, $ ______ Gdes** **O Tès, $ ______ Gdes** **Ki tès? ________________** **O Lot, di ki sa _______________**
Kombyen tan ou te fè la pou jwenn tretman?	**______ Minutes**	**______ Minutes**	**______ Minutes**
Kombyen kòb ou te peye pou konsiltasyon? **Eske se pou chak**	**_______ Gdes O Chak fwa O Total**	**_______ Gdes O Chak fwa O Total**	**_______ Gdes O Chak fwa O Total**

vizit ou byen pou total?			
	Atak #1	Atak #2	Atak #3
Ki sa ou te fè lakay ou pou atak sa? **Si ou te bezwen achete bagay pou tretman sa lakay ou, di kombyen kòb ou te peye.**	**O Bwe medikaman** **Ki medikaman? _____** **Pou kombyen jou? ___ jou** **Kombyen kòb? $ _____ Gdes** **O Mete med fey** **O Mete pomade** **Kombyen kòb? $ _____ Gdes** **O Lave pye ____ fwa chak jou** **O Leve pye** **O Mete konpres fre nan janm** **O Priye** **O Anyen**	**O Bwe medikaman** **Ki medikaman? _____** **Pou kombyen jou? ___ jou** **Kombyen kòb? $ _____ Gdes** **O Mete med fey** **O Mete pomade** **Kombyen kòb? $ _____ Gdes** **O Lave pye ____ fwa chak jou** **O Leve pye** **O Mete konpres fre nan janm** **O Priye** **O Anyen**	**O Bwe medikaman** **Ki medikaman? _____** **Pou kombyen jou? ___ jou** **Kombyen kòb? $ _____ Gdes** **O Mete med fey** **O Mete pomade** **Kombyen kòb? $ _____ Gdes** **O Lave pye ____ fwa chak jou** **O Leve pye** **O Mete konpres fre nan**

Appendix B: (Continued)

	O Lot, di ki sa _____ **Kombyen kòb? $ _____ Gdes**	**O Lot, di ki sa _____** **Kombyen kòb? $ _____ Gdes**	**janm** **O Priye** **O Anyen** **O Lot, di ki sa _____** **Kombyen kòb? $ _____ Gdes**
Eske ou pa't genyen moun'n ki te édé ou ak tretman pou atak-sa?	**O Non O Wi** **Ki moun? _____** **Kijan de travay li fe?** **_____**	**O Non O Wi** **Ki moun? _____** **Kijan de travay li fe?** **_____**	**O Non O Wi** **Ki moun? _____** **Kijan de travay li fe?** **_____**
	Atak #1	Atak #2	Atak #3
Eske ou te kapab travay pendan ou te genyen atak-sa?	**O Non O Wi** **Si *Non*, pou kombyen jou ou pat ka travay? _____ jou**	**O Non O Wi** **Si *Non*, pou kombyen jou ou pat ka travay? _____ jou**	**O Non O Wi** **Si *Non*, pou kombyen jou ou pat ka travay? _____ jou**

Eske anné ki sot pase-a, ou te acheté materiel paske ou gen gwo pye (pa pendan atak-yo)? **O Non** **O Wi**

Si *Wi*, ki sa ou te acheté? **o Souliye/Sandal** **Kombyen kòb? $ _____ Gdes**

o Pomade **Kombyen kòb? $ _____ Gdes**

o Bandage **Kombyen kòb? $ _____ Gdes**

o Ti ban **Kombyen kòb? $ _____ Gdes**

o Kivet **Kombyen kòb? $ _____ Gdes**

o Lot, di sa _____ Kombyen kòb? $ _____ Gdes

Eske semain ki sot pasé ou te:

Lavé rad?	**O Non**	**O Wi**	**Si *Wi*, _____ fwa**
Alé nan maché?	**O Non**	**O Wi**	**Si *Wi*, _____ fwa**
Alé van'n?	**O Non**	**O Wi**	**Si *Wi*, _____ fwa**
Alé leglise?	**O Non**	**O Wi**	**Si *Wi*, _____ fwa**
Alé fonksyone lekol pou pitit-w?	**O Non**	**O Wi**	**Si *Wi*, _____ fwa**

Examen de pye a (Foot exam)

Mesi jam malad la (Leg measurements)

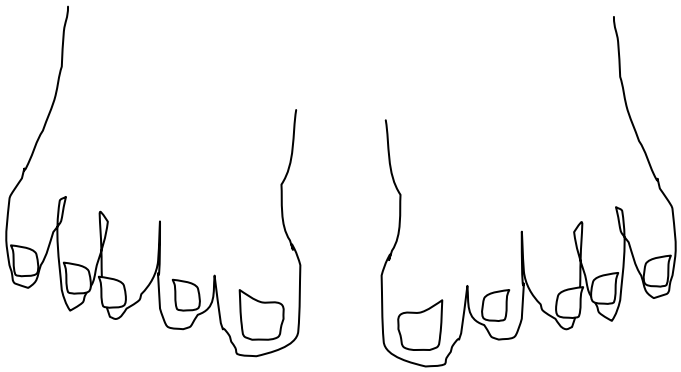
	Pye dwat (R)	**Pye goch (L)**
1- Do pye (foot) (10 cm from toe)	_____	_____
2- Chevill (ankle) (10 cm from floor)	_____	_____
3- Jam (leg) (20 cm from floor)	_____	

Staj maladi a (Stage of illness) _____ _____

Presence des lesions (Lesions present) Oui /Non _____ _____

Si Wi, lokalite lesion-la _____

Lesyon fongal (entry lesions) (indicate on the drawing where all entry lesions are, especially those between the toes)



Konesyans maladi a (Knowledge about the illness)

Eske ou ka di nou kisa ki bay maladi sa a? (Can you tell me what causes this illness?)

1- **Piki insek 2- Maji 3- Antoch/frappe pye 4- Ve 5- Fredi 6- Mank de vitamin 7-Lot, di kisa**

[1-Insect bite 2- Magic 3- Sprain/injure foot 4- Worms 5- Chill 6- Vitamin deficiency 7- Other, explain]

What kinds of care can help your gwopye? (Circle all that patient says)

1- Hygiene/washing 2- Wear shoes 3- Permanganate 4- Crème 5- Elevation 6- Massage 7- Exercise 8- Bandage 9- Medicine 10- Nothing 11 – Other, explain

Are there things you can do to help prevent acute attacks? No _____
Yes _____ (If yes:) What can you do?

1- Hygiene/washing 2- Wear shoes 3- Permanganate 4- Crème 5- Elevation 6- Massage 7- Exercise 8- Bandage 9- Medicine 10- Nothing 11 – Other, explain

What can be done to provide relief during an acute attack? (Circle all that patient says)

1- Hygiene/washing 2- Wear shoes 3- Permanganate 4- Crème 5- Elevation 6- Massage 7- Exercise 8- Bandage 9- Medicine 10- Nothing 11 – Other, explain

Pratik ke malad fe li menm pou swenye pye a (Self-care practices for leg)

Di mwen tou sa ou fe pou pye a ak fwekans (Tell me everything you do for your leg and how often).

	Chak jou (Daily)	Yon fwa/semen (Once/week)	Yon fwa/mwa (Once/month)	Mwens ke sa (Less often)
1- Ijenn	_____	_____	_____	_____
2- Mete sandal	_____	_____	_____	_____
3- Perman.	_____	_____	_____	_____
4- Krèm	_____	_____	_____	_____
5- Elevasyon	_____	_____	_____	_____
6- Masaj	_____	_____	_____	_____
7- Eksersis	_____	_____	_____	_____
8- Bandaj	_____	_____	_____	_____
9- Medikaman	_____	_____	_____	_____
10- Remed fey	_____	_____	_____	_____
11- Pomad	_____	_____	_____	_____
12- Lot:_____	_____	_____	_____	_____

Self-efficacy

Ki lot bagay ou kapab fe pou pye-a ke ou pap fe kounye-a? Fwekans?
What other things can you do to help your leg that you do not currently do? Frequency?

	Chak jou (Daily)	Yon fwa/semen (Once/week)	Yon fwa/mwa (Once/month)	Mwens ke sa (Less often)
1-Ijenn	_____	_____	_____	_____
2-Mete sandal	_____	_____	_____	_____
3-Perman.	_____	_____	_____	_____
4-Krèm	_____	_____	_____	_____
5-Elevasyon	_____	_____	_____	_____
6-Masaj	_____	_____	_____	_____
7-Eksersis	_____	_____	_____	_____
8-Bandaj	_____	_____	_____	_____
9-Medikaman	_____	_____	_____	_____
10-Remed fey	_____	_____	_____	_____
11-Pomad	_____	_____	_____	_____
12-Lot:_____	_____	_____	_____	_____

Eske ou gen konfyans nan kapasite pa-ou pou fe tout bagay posib pou pran swen pye-ou nan meye fason posib?
How confident are you in your ability to do all things possible to take care of your leg the best way you can?

1- Anpil confyans 2- Ti kras confyans 3- A penn confyans 4- Manke confyans 5- Pa ditou konfyans

1- Very confident 2- Somewhat confident 3- A little confident 4- Not very confident 5- Not at all confident

Quality of Life

Euro-Qual – 5D

By placing a check in one box in each group below, please indicate which statements best describe your own health state today.
(Tanpri, pou chak gwoup nan paj sa a, tyeke nan ti kare yo pou ou ka fè nou konnen ki fraz ki esplike pi byen kijan sante ou ye jodi a☺

Mobility (Mouvman)

I have no problems in walking about ☐
(Mwen pa gen pwoblèm pou m mache)

I have some problems in walking about ☐

(Mwen gen kèk pwoblèm pou m mache)

I am confined to bed
(Mwen oblije ret nan kabann toutan)

Self-Care (Pwòpte kò w)

I have no problems with self-care
(Mwen pa gen pwoblèm pou m pwòpte tèt mwen pou kont mwen)

I have some problems washing or dressing myself
(Mwen gen ti pwoblèm pou m fè twalèt mwen, pou m benyen osnon pou m abiye pou kont mwen)

I am unable to wash or dress myself
(Mwen pa ka ni fè twalèt mwen, ni abiye m pou kont mwen)

Usual Activities (e.g. work, study, housework, family or leisure activities)
{Aktivite Ou Abitye Fè *(pa egzanp: ale travay, etidye, fè travay nan kay, fè aktivite ak fanmi an osnon amizman)}*

I have no problems with performing my usual activities
Mwen pa gen pwoblèm pou mwen fè aktivite mwen toujou abitye fè yo

I have some problems with performing my usual activities
(Mwen gen ti pwoblèm pou mwen fè aktivite mwen abitye fè yo)

I am unable to perform my usual activities
(Mwen pa kapab fè aktivite mwen te konn abitye fè yo ankò)

Pain/Discomfort (Doulè ak malalèz)

I have no pain or discomfort
(Mwen pa gen doulè, mwen pa malalèz ak janm lan)

I have moderate pain or discomfort
(Mwen gen ti doulè epi mwen yon ti jan malalèz ak janm lan)

I have extreme pain or discomfort
(Mwen gen anpil doulè, mwen malalèz anpil ak janm lan)

Anxiety/Depression (Enkyetid ak Dekourajman)

I am not anxious or depressed
(Mwen pa gen enkyetid; mwen pa dekouraje non plis)

I am moderately anxious or depressed
(Mwen gen yon ti enkyetid, mwen yon ti jan dekouraje)

I am extremely anxious or depressed
(Mwen gen anpil enkyetid; mwen dekouraje anpil)

To help people say how good or bad a health state is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked 100 and the worst state you can imagine is marked 0.

(Pou ede moun jwenn yon fason pou yo ka esplike si sante yo anfòm osnon si sante yo pa anfòm, nou trase pakèt ba sa yo (ki sanble ak yon tèmomèt). Pi bon sante yon moun ka imajine rive sou liy san (100) epi lè sante a pa bon ditou li rive jouska liy 0 (zewo).

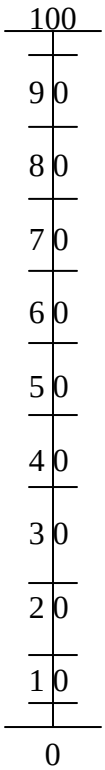
We would like you to indicate on this scale how good or bad your own health is today, in your opinion. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your health state is today.

(Nou ta renmen ou di nou dapre pakèt ba sa yo kijan dapre ou sante ou anfòm osnon si li pa bon jodi a. Tanpri, trase yon liy apatid kare nwa sa a, jiska pwen sou pakèt ba sa yo ki montre kijan sante ou bon osnon kijan li pa bon jodi a.)

Best Imaginable Health State

(Sante ki pi bon ou ka imajine)

Your own Health State



Worst Imaginable Health State

(Sante ki pi mal ou ka imajine)

Center for Epidemiologic Studies Depression Scale (CED-D), NIMH

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.
Make bwat ki pi byen montre jan ou te santi-ou oubyen jan ou te aji PANDAN SEMENN PASE-A

During the Past Week				
	Rarely or none of the time (less than 1 day) ***Raman. Ou, pa minm yon fwa (mwens ke yon jou)***	**Some orr a little of the time (1-2 days)** ***Kek fwa. Ou, yon ti kras tan. (1 a 2 jou)***	**Occasionally or a moderate amount of time (3-4 days)** ***Ase souvan oubyen, yon kantite modere (3 a 4 jou)***	**Most or all of the time (5-7 days)** ***Pi fo Oubyen tout tan. (5 a 7 jou)***
1. I was bothered by things that usually don't bother me. Kek bagay te deranje-m ki pa abitye deranje-m				
2. I did not feel like eating; my appetite was poor. Mwen pa't santi-m mwen ta manje Apeti-m te ba				
3. I felt that I could not shake off the blues even with help from my family or friends. Mwen pa't santi-m te kapab souke tristes mwen malgre				

fanmi-m ak sanmi-m yo ede-m				
4. I felt I was just as good as other people. Mwen te santi-m byen menm jan ak tout lot mounn.				
5. I had trouble keeping my mind on what I was doing. Mwen te genyen difikilte konsantre sou sa mwen'tap fe.				
6. I felt depressed Mwen te santi-m demoralize				
7. I felt that everything I did was an effort. Mwen santi tout sa mwen fe se ak gwo efo.				
	Rarely or none of the time (less than 1 day) ***Raman. Ou, pa minm yon fwa (mwens ke yon jou)***	**Some orr a little of the time (1-2 days)** ***Kek fwa. Ou, yon ti kras tan. (1 a 2 jou)***	**Occasionally or a moderate amount of time (3-4 days)** ***Ase souvan oubyen, yon kantite modere (3 a 4 jou)***	**Most or all of the time (5-7 days)** ***Pi fo Oubyen tout tan. (5 a 7 jou)***
8. I felt hopeful about the future.				

Mwen santi mwen genyen espwa avek avni mwen.				
9. I though my life had been a failure. Mwen te panes la vi-m te yon gwo echek.				
10. I felt fearful. Mwen te santi mwen pe				
11. My sleep was restless. Mwen te san somey				
12. I was happy. Mwen te kontan.				
13. I talked less than usual. Mwen te pale mwens ke mwen Abitye.				
14. I felt lonely Mwen te santi mwen poukont Mwen.				
15. People were unfriendly Mwen te konn banmwen tretman fret.				
16. I enjoyed life. Mwen te jwi lavi mwen.				
17. I had crying spells. Mwen te pran kriye yon paket fwa.				
18. I felt sad. Mwen te santi mwen tris.				

19. I felt that people dislike me. Mwen te santi ke mounn pa't renmen mwen.				
20. I could not get "going" Mwen pa't kapab souke ko'm pou mwen demare.				

CDC Healthy Days Questions

1. Eske-w ka di an jeneral kijan sante-w ye: (would you say that in general your helath is:)

Read responses 1a-e.

a. Ekselan
b. tre byen
c. byen
d. pa mal ou
e. mal.
f Mwen pa konen / Mwen pa si
g. Refuse

Pa li repons pou kesyon swivan. (Do not read the responses for the following questions)

2. Kounye-a nap panse a sante ko ou, maladi ko ou ak aksidan ladan tou, konbyen jou nan mwa ki sot pase sante ko ou pat byen? (Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?)

a. Nomb jou ____Number of days ____
b. Ayen____ None____
c. Pa konnen ____Don't know____
d. Refuse____ Refused____

3. Kounye-a nap panse a maladi nan tet, maladi stres, depresyon, e pwoblem avek emosyon, konbyen jou nan mwa ki sot pase ya ou te malad nan tet? (Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?)

a. Nomb jou ____Number of days ____
b. Ayen____ None____
c. Pa konnen ____Don't know____
d. Refuse____ Refused____

4. Nan mwa ki sot pase a, konbyen jou maladi ko ou ak maladi tet fe ou pa kab fe aktivite-w abitye fe, tankou okipe tet ou, travay, ak amizman? (During the past 30

days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?)
a. Nomb jou ____Number of days ____
b. Ayen____ None____
c. Pa konnen ____Don't know____
d. Refuse____ Refused____

Kesyon kap ven you se sou limitasyon ou kap genyen chak jou nan lavi-w. (The next questions are about limitations you may have in your daily life).

1. Eske ou limite nan aktivite-w paske ou domaje oubyen gen pwoblem sante? (Are you limited in any way in any activities because of any impairment or health problem?)

   a. Wi (Yes)
   b. Non – ale nan Kesyon 6 (No – go to question 6)
   c. Pa konnen – Ale nan kesyon 6 (Don't know – go to question 6)
   d. Refuse – Ale nan kesyon 6 (Refused – go to question 6)

2. Ki domaj oubyen pwoblenm sante presipal ou gen ki fe ou pa kap fe aktivite? (What is the MAJOR impairment or health problem that limits your activities?) DO NOT READ. SELECT ONLY ONE CATEGORY.

   a. arthrit (arthritis)
   b. pwoblem avek do oubyen kou (back or neck problems)
   c. fwakti, mal zo (fractures, bone/joint injury)
   d. pwoblem mashe (problems walking)
   e. pwoblem avek respiration (lung/breathing problem)
   f. difikilti koute (hearing problem)
   g. pwoblem avek je (eye / vision problem)
   h. maladi ke (heart problem)
   i. maladi atak "stroke" (stroke problem)
   j. tansyon (high blood pressure)
   k diabet/sik (diabetes)
   l. kanse (cancer)
   m. depression / anxiety / emotional problems
   n. **gwo pye (lymphedema)**
   o. lot pwoblem (other problem) _____
   p. Pa konnen (Don't know)
   q. Refuse (Refused)

3. Kombyen tan sa genyen depi ou gen domaj presipal sa? (For how long have your

activities been limited because of your major impairment or health problem?) PA LI REPONS. MAKE SA LI DI. (DO NOT READ. CODE APPROPRIATE UNIT OF TIME.)

a. _____ jou (days)
b. _____ semann (weeks)
c. _____ mwa (months)
d. _____ ane (years)
e. Pa konnen (Don't know)
f. Refuse (Refused)

4. Poutet domaj oubyen pwoblem sante, eske ou beswen lot moun okipe ou, tankou pou manje, benyen, mete rad sou ou, ou pou mache nan kay la? (Because of any impairment or health problem, do you need the help of other persons with your PERSONAL CARE needs, such as eating, bathing, dressing, or getting around the house)?

a. Wi (Yes)
b. Non (No)
c. Pa konnen (Don't know)
d. Refuse (Refused)

5. Poutet ou domaje oubyen pwoblem sante, eske ou beswen ed pou fe aktivite chak jou-w, tankou menaj nan kay, komes, fe pwovizyon, oubyen soti pou fe lot bagay? (Because of any impairment or health problems, do you need the help of other persons in handling your ROUTINE needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?)

a. Wi (Yes)
b. Non (No)
c. Pa konnen (Don't know)
d. Refuse (Refused)

6. Nan trant jou ki sot pase yo konbyen jou ko'w te fe telman mal li te di pou ou fe acktivite nomal tankou okipe tet ou, travay, ou rekreyasyon? (During the past 30 days, for about how many days did PAIN make it hard for you to do your usual activities, such as self-care, work, or recreation?)

a. _____ Nomb jou (number of days)

b. Ayen (None)
c. Pa konnen (Don't know)
d. Refuse (Refused)

7. Nan trant jou ki sot pase-a konbyen fwa ou te santi ke'w pa kontan, tris, ou chagren? (During the past 30 days, for about how many days have you feldt SAD, BLUE, or DEPRESSED?)

a. _____ Nomb jou (number of days)
b. Ayen (None)
c. Pa konnen (Don't know)
d. Refuse (Refused)

8. Nan trant jou ki sot pase-a konbyen fwa ou te santi ke pa kontan, enkye, tandi, ke pa pose? (During the past 30 days, for about how many days have you felt WORRIED, TENSE, or ANXIOUS?)

a. _____ Nomb jou (number of days)
b. Ayen (None)
c. Pa konnen (Don't know)
d. Refuse (Refused)

9. Nan trant jou ki sot pase-a konbyen jou ou te santi ou pa pran ase repo oubyen ou pa ase domi? (During the past 30 days, for about how many days have you felt that you did not get ENOUGH REST OR SLEEP?)

a. _____ Nomb jou (number of days)
b. Ayen (None)
c. Pa konnen (Don't know)
d. Refuse (Refused)

10. Nan trant jou ki sot pase a konbyen jou ou te santi ou pat an fom oubyen avek anpil eneji? (During the past 30 days, for about how many days have you felt VERY HEALTHY AND FULL OF ENERGY?)

a. _____ Nomb jou (number of days)
b. Ayen (None)
c. Pa konnen (Don't know)
d. Refuse (Refused)

Appendix C: Map of Port-au-Prince Area.