Original Research Article

KNOWLEDGE AND MANAGEMENT OF BURULI ULCER DISEASE: A CASE STUDY AT SEKYERE AFRAM PLAINS DISTRICT OF ASHANTI REGION, GHANA

ABSTRACT

Introduction: The goal of the study was to assess the management of Buruli ulcer cases in the Sekyere Afram Plains District of Ashanti Region.

Methods: The study used a quantitative study type and cross-sectional study design with a sample size of 251 comprising Buruli Ulcer (BU) patients, health workers and community members as study population. The study used a structured questionnaire for the primary data. The questionnaire was used because the respondents were literates and could read and respond to the items without difficulty. Data collected were edited and coded and statistically analyzed using SPSS version 26 software. Inferential and Descriptive statistics such as frequencies and percentages were used to describe the study variables. Chi-square (p-values) was used and the data were analyzed in tables with significance level set at 0.05.

Results: The results revealed that the patient's knowledge, about BU was 61.9% which was statistically significant (p-value= *0.000*). It also revealed association between knowledge on Buruli ulcer and demographic characteristics of respondents (*p-value = 0.000*). Relatively colossal number of respondents (81.0%) revealed that they were not an active member of NHIS.

Conclusion: The study concludes that if health workers are trained on BU and more education is given to the community members on Buruli ulcer disease, their health seeking behaviour would be improved to reduce complications associated with Buruli ulcer disease in the District. The study recommends that Ghana Health Service should organize training and refresher courses for health care workers to increase their knowledge on Buruli ulcer.

Keywords: *Buruli Ulcer, Management, Afram Plains, Ashanti*

INTRODUCTION

1.1 Background to the Study

Buruli ulcer disease is assuming public health importance in many countries, prompting the establishment of a Global Buruli Ulcer initiative by the World Health Organization [1] in early 1998. Ever since Mycobacterium ulcerans infection was first described in Australia in 1948 and later named Buruli ulcer in Uganda, cases have been reported throughout the tropical and subtropical world. In the African WHO region, at least 16 of 46 member countries have reported cases, especially in West Africa and parts of Eastern and Central Africa.

One characteristic of the disease is its apparent association with water bodies worldwide. Buruli ulcer commonly affects the young, even though cases are reported in all age groups. Mulder *et al.* [2] in their research did not find any sex difference, but another study reported prevalence to be higher among women than men and among boys than girls [3]. Age is important to note, since 70% of all cases occur in children under 15 [4]. The youngest reported case to date is a 6-week old baby; the oldest is 70 years of age [5]. Population structure is important in Buruli ulcer because in many countries where it is endemic, 50% or more of the population is under the age of 18 [6]. Gender plays a part in Buruli ulcer, not necessarily because of a specific difference of genetics, but more than likely because of occupational roles such as farming for men, bathing of children, and the method in which women do laundry [7]. Buruli ulcer has been documented in 31 sub-tropical and tropical locations [8]. Angola, Sri Lanka, Sudan, Suriname, Togo, Uganda etc. are among the countries represented [9]. A few sporadic instances in non-endemic regions of North America and Europe have been identified, but these cases have been connected to foreign travel [10]. Cases were recorded in 14 countries in 2018, the most of which are in Africa, where efforts to control the illness have been concentrated [11]. Buruli ulcer quietly eats through the skin, muscle, and bone, leaving sufferers with disfiguring and crippling craters in the worst cases [12]. The number of questions regarding Buruli Ulcer, on the other hand, is formidable. Nobody knows where the bacteria are located in the environment [13]. It is also unclear how it enters the body, despite the fact that the bacteria are clearly incapable of doing so on its own [14].

Buruli Ulcer was first brought to public notice in Ghana in 1993, when severe instances were reported from the Ashanti Region's Amansie West area in August, 2010 [15]. Tontokorom was the most afflicted town, however earlier cases were documented from the Densu and Afram plains, according to a study [16] and [17]. A countrywide study undertaken in Ghana in 1999

discovered 6000 cases and revealed that Buruli ulcer was present in all ten regions at the time. Since then, more than 2800 more instances have been reported from various areas. In 2003, 739 instances were documented, while 562 new cases were reported in the first half of 2018. In 2019, 30 districts reported on the illness to the National Control Program on a regular basis [18]. The general national prevalence rate of active Buruli ulcer is 20.7 per 100,000 people however it may reach 150.8 per 100,000 people [19]. Ashanti, Central, Brong Ahafo, Greater Accra, and Eastern are the most impacted areas [20]. Ghana was the second most endemic nation, behind Cote d'Ivoire, in terms of Buruli ulcer cases in 2012 [21]. Buruli ulcer has lost its public health prominence, making it harder to garner donor funding. Meanwhile, this is a sickness that affects those living on less than a dollar each day [22].

Buruli ulcer occurs in areas where there has been significant disturbance to the environment through mineral and sand mining, damming, irrigation, deforestation and rapid urbanization [23], [24]. Studies suggest that contact with water bodies such as ponds, lakes, rivers and dams through farming, fishing, bathing and wading are risk factors [25]; [26; [27]. Based on epidemiological evidence, person-to-person transmission is rare or impossible [28]; [29]; [30]. The main mode of infection from the environment to humans and the exact reservoirs remain unclear. However, it is hypothesized that the etiological agent enters the body through skin trauma or insect bites [31].

The decision by Buruli ulcer patient to seek any other form of treatment has been attributed to many factors such as culture, stigma and lack of modern form of health care. Other possible factors such as health staff attitude and proximity to the nearest health center will either motivate or demotivate Buruli ulcer patient to access heath [32]. If stigma is attached to the disease, then the individual may try to deny the disease and seek for help from herbalists. The decision to either self-medicate or seek the services of traditional healers and spiritualists is due to lack of knowledge of a strange disease [33].

Current case management strategies emphasize the importance of early reporting and timely and appropriate medical treatment of nodules before they ulcerate and give rise to debilitating disease sequelae of osteomyelitis, contracture deformities and disabilities [34]. However, there are a wide range of social, demographic and gendered factors that influence experience, meaning and behaviour for Buruli Ulcer. In widespread areas, predominantly rural communities in Africa, people may be aware of Buruli ulcer's relationship with the environment, yet simultaneously

associate it with witchcraft or other mystical causes [35]. This dual appreciative of the disease combined with poor access to orthodox medicine pushes many to seek traditional healers as primary care [36]. Traditional healers often treat Buruli ulcer with a divided approach: herbs and sometimes burning or bleeding to treat the physical wound; and confession, ritual purification, and prohibitions on food, interpersonal contact, or sex to treat the spiritual component of the disease [37]. Those with Buruli ulcer report feeling shame and facing social stigma that could affect their relationships, school attendance, and marriage prospects [38].

According to a previous WHO report, the total number of Buruli ulcer cases registered worldwide, including Ghana, is 5,076, with Africa being the most afflicted. Because of mycolactone local immune-suppressive qualities, the condition advances without pain or fever, which may explain why persons afflicted, do not always seek immediate treatment. However, if not treated, enormous ulcers develop, with typical and weakened boundaries [39]. Sometimes the bone is damaged, resulting in severe abnormalities. Scarring may cause reduced mobility of limbs and other lasting impairments in around a quarter of individuals after lesions heal [40]. The purpose of this study was to look at the current knowledge as well as the measures put in place to enhance the management of Buruli Ulcer cases in the Sekyere Afram Plains District.

Statistics from the World Health Organization indicates that the annual number of suspected Buruli Ulcer cases reported globally was around 5000 cases up until 2010 when it started to decrease until 2016, reaching its minimum with 1961 cases reported. The number of cases, however, rose to 2713 in 2020 [41]. The reasons for the fluctuation are not clear. In Africa, most cases are reported from West and Central Africa, including Benin, Cameroun, Cote d'Ivoire, DR Congo, Ghana and Nigeria. Liberia has recently started to report large number of suspected cases, while Cote d'Ivoire, which used to report highest number of cases in the world (2,242 cases in 2008), reported only 261 cases in 2018 [42].

In Ghana most of the cases are under reported, averagely over 1,000 cases are recorded annually [43. About 18 districts reported Buruli ulcer cases in Ghana in 2016 [44]. In the Ashanti region, 10 districts including Sekyere Afram Plains reported Buruli ulcer cases [45]. This by implication means that Ghana's situation so far as Buruli ulcer is concerned is alarming. The Ghana Ministry of Health 2012 annual report shows the Ashanti Region accounted for over 60% of all cases of Buruli ulcer. A national search for cases of Buruli ulcer in Ghana identified 5,619 patients, with 6,332 clinical lesions at various stages [46]. The overall crude national prevalence rate of active

lesions was 20.7 per 100,000, but the rate was 150.8 per 100,000 in the most disease-endemic district. The case search demonstrated widespread disease and gross underreporting compared with the routine reporting system [47].

Sekyere Afram Plains is one of the most deprived districts in the Ashanti Region and lacks the requisite human resource and basic social amenities including health infrastructure. The district is bedeviled with some Neglected Tropical Diseases (NTDs) including Buruli ulcer where most patients report late to the health facility or do no report at all. Others resort to herbalists, spiritualists and prayer camp due to inadequate knowledge on the disease, poverty and ignorance in some instances. Health staff who are the major stakeholders as far as management of Buruli ulcer was concerned also lacks the requisite skills and expertise in handling the condition coupled with logistical challenge and infrastructure. In the absence of strategies to prevent infection, control of Buruli ulcer will continue to rely on efficient health services to prevent the progression of the pre-ulcerative condition [48].

Most of these BU cases are reported at the ulcerative stage, being the late stage of the infection. Reasons for the late reporting to the health facility are that they visited herbalists and spiritualist due to the nature and the onset of the disease. Others mention lack of health services in their catchment areas, including drugs and other case management logistics in areas with access to healthcare. In the endemic areas in Sekyere Afram Plains, despite free medical treatment, many infected persons prefer other treatment sources to hospital treatment [49]. If this phenomenon is not rectified, cases will be reported at late stages and this could lead to disfigurement, permanent disability and amputation. Some BU patients resort to herbalists, spiritualists and prayer camp due to inadequate knowledge on the disease, poverty and ignorance in some instances. Health staff who are the major stakeholders as far as management of Buruli ulcer is concerned also lacks the requisite skills and expertise in handling the condition coupled with logistical challenges and infrastructure [50]. The study, therefore, explored the knowledge and management of Buruli ulcer disease at the Sekyere Afram Plains District of Ashanti Region.

Even though lots of studies on the disease have been undertaken in various endemic countries, very little has been done on the management of the disease in the rural communities [51]. Hopefully, this study will help to understand why people do not seek treatment from Health Facilities early and also provide a critical and analytical perspective for understanding the management and knowledge of Buruli ulcer in the area of study.

2. METHODS

2.1 Study Area

The Sekyere Afram Plains District is one of the forty-three (43) administrative districts in the Ashanti Region of Ghana. Its capital is Drobonso. The district was carved out from Sekyere Kumawu District in 2012. The District is located at the North-Eastern part of the Ashanti Region between latitude (**ϕ**) 20' N and 1o 2' N and longitudes (**λ**) 6^o 52'W and 7^o 32'W. It is boarded on the south by Sekyere Kumawu District, on the east by Sekyere Central and the west by Asante Akim North. The district covers an estimated land area of 2,450.39 square kilometers. This makes the district the largest in terms of land area in the region representing 14.5 per cent of the total regional land size [52]. Sekyere Afram Plains has an estimated population of 36,937 with 134 communities. The district has nine (9) health facilities which include 2 health centres, 4 clinics and 3 Community-Based Health Planning and Services (CHPS) compounds. The district has no district hospital. There is one Christian Health Association of Ghana (CHAG) facility and 8 public facilities. Most cases are referred to the Kumawu Polyclinic and Agogo Presbyterian Hospital both in Ashanti and Atebubu Government Hospital in the Bono East Region [53]. The area is largely a farming community and making of charcoal. A few are government workers whilst others are petty traders. The district is predominantly composed of people of the northern region with few Ashantis. Christianity is the dominant religion followed by Islam and a few Traditionalists.

2.2 Study Population

The target population for the study comprised of Buruli ulcer patients, health workers and some community members at the Sekyere Afram Plains District. The community members comprised the relatives or close friiends of clients who lived in a household with Buruli ulcer patients.

2.3 Study Design

A cross-sectional quantitative study was used to explore the knowledge and management of Buruli ulcer disease among the patients, health workers and community members. This design was preferred because of the duration of the study and described what was happening presently as far as Buruli ulcer management was concerned in the district. A questionnaire was administered face-to-face using closed-ended and open-ended questions to obtain meaningful information on the topic at that particular point in time.

2.4 Sample Size

Buruli ulcer patients: The Sekyere Afram Plains District Buruli ulcer Register 2019-2021 as the main source of data for information on patients currently receiving treatment. The number of Buruli ulcer patients was 42 on the Register. Thus, a census sampling was used to include all the patients. Healthcare Workers: Taro Yamane formula was adopted to estimate the sample size for the health workers (Yamane, 1967). Thus:

$$n = \frac{N}{1+N(e)^2}$$

n- The sample size; *N*- Size of population; *e*- The error of 0.05

With sampling error of 5% and confidence interval of 95%, the calculation for the sample size of 86 healthcare workers in the district equals 71. Proportionate and Convenient sampling was further used to select 71 health workers from the facilities for the study.

Table 1: Stratified Proportionate Sampling Table for Health Care Workers

Health Facility	**Total Number of HCW**	**Sampled**
Drobonso GHS Clinic	16	13
Hamidu Clinic	15	13
Anyinofi Health Centre	14	12
Auntie Riek Clinic	14	12
Dawia Health Centre	7	7
Funsua Health Centre	9	7
Seneso CHPS Compound	9	7
Akoma CHPS Compound	9	7
Total	86	71

Table 2: Sample distribution of study respondents

Respondents	**Number**
BU Patients	42
Health workers	71
Community members	138
Total	251

2.5 Sampling Technique

Stratified and simple random sampling methods were used to select the respondents. After deciding on the number of samples from each stratum, simple random sampling method was used to select the actual respondents. This was done by writing 'yes' and 'no' on pieces of paper.

The healthcare workers and the community members who chose 'yes' were included whereas all the patients were included in the study.

2.6 Study Variables

For this study, the researcher attempted to assess the dependent of management of Buruli ulcer disease in the district whilst the independent variables included knowledge, age, sex, educational level and occupation.

2.7 Data Collection Tool and Technique

The study used a structured questionnaire for the primary data. The questionnaire was used because most of the respondents were literates and could read and respond to the items without difficulty. Respondents who were illiterates were assisted by the researcher or an interpreter. The administration mode was face-to-face. Questionnaire was administered either by the researcher or research assistants and lasted for a maximum of 25 minutes. In administering the questionnaire for patients, it was done at the health facility as they visited there for their wound care. Those who failed to visit the facility during the period of the study were followed up in their homes with the help of the Community Health Officer (CHO) responsible for the zone. Concerning the community members or relatives, the questionnaire was administered mainly at the community level (household). Patients assisted the Principal Investigator to identify those in the household. For Healthcare workers the questionnaire was administered at the health facility. The languages used were English and Twi. The questionnaire was grouped under the following headings: section A: socio-demographic Information, e.g. Age, sex, educational level, etc; Section B: Knowledge on Buruli ulcer; Section C: Availability of drugs, diagnostic materials and support for BU patients and Section D: Capacity of health staff to manage BU disease.

2.8 Pretesting

The questionnaire was pretested at Agogo in the Asante Akim North District of Ashanti Region. Agogo has similar characteristics in terms of socio-economic activities as well as the management of Buruli ulcer cases where BU Clinics are held on every Wednesday of the week at the Agogo Presbyterian Hospital. The pretesting assisted the Principal Investigator to determine if the respondents would understand the questions during the actual data collection. Essentially it identified some challenges with the data collection instrument and found possible solutions.

2.9 Data management

The data collected were made available to only the members of the research team. Data collected through questionnaire were coded to ensure anonymity and protect the privacy of respondents. The researcher kept records of data, time and place of interview. Respondents names were not writing but rather they were given number kept in files for every respondent.

2.10 Data Analysis

The data collected were coded, entered and cleaned using Microsoft Excel software and then imported into SPSS version 26 for analysis. Inferential and Descriptive statistics such as frequencies and percentages were used to describe the variables such as the socio-demographic information and the knowledge level of the participants. Chi-square (p-values) was used and the data were analyzed in a tabular form and drawn inferences between the different data sets and established whether the data were mutually exclusive or with some relationship.

3.11 Ethical considerations

Permission was sought from the Ghana Health Service Ethics Review Committee before the study was conducted. A protocol No GHS-ERC 060/05/21 was obtained from the ERC. Before the study could begin, approval was requested from the Sekyere Afram Plains District Health Directorate. Participants were made known that their names or other contact information would not be linked to the data analysis or dissemination of the study's findings under any circumstances. The participants were informed that all of their responses would be kept private both before and after the data collection. Furthermore, participants were told that all data would be stored, analyzed, and reported in codes, and that the respondents' identities would not be revealed. In addition, the participants were given an informed consent sheet with details about their willingness to engage in the study, and they signed it indicating their acceptance and approval to participate in the study. The participants were informed that participation in the study was completely voluntary and that no one was compelled to do so. They were free to go and there was no prejudice against them at the hospital's service acquisition procedure. The participants in the study were not at risk, but only a portion of their time was required for answering questions, which may have been a source of stress for them.

During the interview, each participant was treated individually and kept at a safe distance from the others so they wouldn't hear the dialogue for confidentiality.

3. RESULTS

3.1 Demographic Characteristics of Respondents

Table 3: shows the sociodemographic characteristics of the respondents. The majority of the respondents 70 (50.7%) were males from the relative group. More than half of the healthcare workers 57 (80.3%) were within the age range 28-37 years. On marital status, majority of the healthcare workers 36 (50.7%) were married whilst 24 (57.1%) of the patients were single. All the healthcare workers 71 (100%) had tertiary qualification as against 73 (52.9%) relatives who had no formal education. Majority of the respondents from all the groups were Christians with few of them been traditionalists. Almost half of the relatives and the patients 57 (41.3%) and 16 (38.1%) respectively were farmers.

Table 3: Demographic Characteristics of Respondents

Characteristic	Patients F(%)	Relatives F (%)	Health Workers F(%)
Sex			
Male	21(50.0)	70(50.7)	44(62.0)
Female	21(50.0)	68(49.3)	27(38.0)
Age (years)			
Below 18	15 (35.7)	0 (0.0)	0 (0.0)
18 – 27	11 (26.2)	42 (30.4)	4 (5.6)
28 – 37	8 (19.0)	23 (16.7)	57 (80.3)
38 – 47	5 (11.9)	30 (21.7)	10 (14.1)
48 – 57+	3(7.2)	43 (31.2)	0 (0.0)
Marital Status			
Married	14(33.3)	68(49.3)	36(50.7)
Single	24(57.1)	51(37.0)	31(43.7)
Separated/Divorced/Widow	4(9.6)	19(13.8)	4(5.6)
Educational Level			
No formal	16(38.1)	73(52.9)	0(0.0)
Primary	18(42.9)	18(13.0)	0(0.0)
JHS/Middle School	5(11.9)	35(25.3)	0(0.0)
SHS	2(4.8)	10(7.2)	0(0.0)
Tertiary	1(2.4)	2(1.4)	71(100.0)
Religion			
Christian	21(50.0)	80(58.0)	62(87.3)
Islam	18(42.9)	53(38.4)	9(12.7)
Traditional	3(7.1)	5(3.6)	0(0.0)
Main Occupation			
Farmer	16(38.1)	57(41.3)	0(0.0)
Student	15(35.7)	27(19.6)	0(0.0)
Trader	3(7.1)	12(8.7)	0(0.0)
Civil/Public Servant	1(2.3)	5(3.6)	71(100.0)
Artisan	7(14.6)	37(26.8)	0(0.0)

3.2 Bivariate Analysis of Patients and Family member's Knowledge on BU management

Table 4: presents results on patients and relative's knowledge on BU management. With respect to patient's knowledge, about 61.9% of the respondents revealed that they have not heard about Buruli ulcer before which was statistically significant (p-value= *0.000*). With statistical significance (p-value= *0.000*), majority of the respondents 64.3% of the debunked the statement "Living near river bodies is the main risk factor associated with Buruli ulcer". Respondents 64.3% opined that they would know if someone has the disease which was significant (p-value= *0.000*). The rest of the variables were not statistically significant with p-value more *0.05*).

Table 4: Bivariate Analysis of Patients and Family member's Knowledge on BU

Statement	**BU Patient f (%)**	**Relatives f (%)**	**χ(p-value)**
Ever heard of Buruli Ulcer			
Yes	16(38.1)	40(29.0)	54.783(*0.000*)*
No	26(61.9)	98(71.0)	
A disease that affects skin and bone			
Yes	12(28.6)	39(28.3)	3.654(*0.453*)
No	30(71.4)	99(71.7)	
Is germ the major causative agent of BU?			
Yes	21(50.0)	61(44.2)	4.876(*0.423*)
No	21(50.0	77(55.8)	
Living near river bodies is the main risk factor associated with Buruli ulcer			
Yes	15(35.7	44(31.9)	41.733(*0.000*)*
No	27(64.3)	94(68.1)	
Would you know if someone has the disease?			
Yes	27(64.3)	75(54.3)	2.345(0.*002)**
No	15(35.7)	63(45.7)	
Did you report at a health facility when you noticed you had BU?			
Yes	16(38.1)		7.823(*0.006*)
No	26 (61.9)		

*Source: Field Survey, 2021 *= significant*

3.3 Association between Knowledge and Demographic Characteristics of Buruli ulcer patients and Family members

Table 5: reveals the association between knowledge on Buruli ulcer and demographic characteristics of respondents. Knowledge on Buruli ulcer was generally low. However, sex and educational level had statistically significant association with knowledge on Buruli ulcer (χ^2 =

41.640; p = .000: χ^2 = 24.846; p = .000). Also, no statistically significant association was found between demographic characteristics (age, marital status, religion, and occupation) and knowledge on Buruli ulcer.

Table 5: Association between Knowledge and Demographic Characteristics of Buruli ulcer patients and Family members

Characteristics	Low Knowledge	High Knowledge	Chi-square value	*Sig. (2-tailed)
Sex			41.640	0.000*
Male	44(24.5%)	47(26.1%)		
Female	60(33.3%)	29(16.1%)		
Age (yrs.)			5.562	0.474
<18	7	8		
18-27	36	17		
28-37	19	12		
38-47	18	17		
48-57	17	8		
58-70	8	9		
>70	2	2		
Marital Status			4.75	0.783
Single	21	54		
Married	25	58		
Cohabiting	5	17		
Educational Level			24.846	0.000*
No formal	63	26		
Primary	24	12		
Middle/JHS	18	22		
SSS/SHS	2	10		
Tertiary/Higher	0	3		
Religion			4.763	0.092
Christianity	53	48		
Islam	49	22		
Traditional	5	3		
Occupation			4.933	0.294
Farmer	22	51		
Trader	6	17		
Artisan	7	32		
Student	2	1		
Civil/Public Servant	14	28		

3.4 Management of Buruli Ulcer disease among patients and relatives

Table 6: displays the results on management Buruli ulcer among patients and relatives. Most of respondents (81.0%) revealed that they were not active members of NHIS. Similarly, 81.0% of the respondents they were not aware of the free treatment of Buruli ulcer. Majority of the respondents (78.6%) indicated that health facility was the place to manage BU. About, 57.1% of

the respondents indicated that they dress their wounds on weekly basis. Majority of the respondents (76.1%) said they could not afford the cost of transportation to the facility to dress their wound. Most of the respondents (52.4%) did not receive regular drugs. Most of the respondents (61.9%) did receive enabler's package from the health system quarterly. Almost half of them (45.2%) stated that health workers attitude towards Buruli ulcer patient was good.

Table 6: Management of Buruli Ulcer disease among patients and relatives

Statement	F / №	%
Active member of NHIS		
Yes	8	19.0
No	34	81.0
Awareness of free BU service?		
Yes	8	19.0
No	34	81.0
Is the health facility best place to manage your condition?		
Yes	33	78.6
No	9	21.4
Frequency of wound dressing?		
Daily	7	16.7
Bi-weekly	11	26.2
Weekly	24	57.1
Can you afford transportation for wound dressing?		
Yes	10	23.8
No	32	76.1
Regular receipt of drugs?		
Yes	20	47.6
No	22	52.4
How often do you receive enablers' package?		
Not at all	5	11.9
Weekly	0	0.0
Monthly	11	26.2
Quarterly	26	61.9
Health workers attitude		
Very Good	12	28.6
Good	19	45.2
Bad	11	26.2
Very Bad	0	0.0

3.5 Capacity of Health Staff to manage Buruli ulcer cases

Table 7: displays the results on the management of Buruli ulcer patients. Most of the respondents (81.0%) revealed that they were not active members of NHIS. Similarly, 81.0% of the respondents indicated that they were not aware of the free treatment of Buruli ulcer. Also, majority of them (78.6%) indicated the health facility as the best place to manage the condition.

About, 57.1% of the respondents dressed their wounds on weekly basis. Majority of the respondents (100.0%) disagreed to the statement "Can you afford the cost of transportation to the facility to dress your wound". In response to how often respondents do receive enabler's package from the health system, 61.9 % received the package quarterly. Almost half of the respondents (45.2%) stated that health workers had good attitudes towards Buruli ulcer patient.

Table 7: Capacity of Health Staff to manage BU cases

Statement	Frequency	Percent (%)
Have you received refresher training in wound care?		
Yes		
No	71	100.0
Is intensified BU case screening offered in your facility?		
Yes	71	100.0
No		
Are there adequate BU diagnostic equipment in your facility?		
Yes	21	29.6
No	50	70.4
Loss of patients before completing their BU treatment?		
Yes	71	100.0
No		
Don't know		
If yes, how do you trace defaulters		
Home visit only	56	78.9
CWC & Home visit	13	18.3
Community Outreach	2	2.8
Are BU drugs and dress solution available in your facility?		
Yes		
No	71	100.0
Do you receive incentives in managing BU patients?		
Yes		
No	71	100.0
How often is BU education organized in this facility?		
Not at all	15	21.1
Once in a month	35	49.3
Twice in a month	14	19.7
Above twice in a month	7	9.9

4 DISCUSSION

4.1 Patients and Family members' Knowledge on Buruli ulcer

The first objective assessed the knowledge level of the respondents on Buruli ulcer. The findings from the study revealed that the knowledge level of patients and family members was generally low. Most of the respondents stated they had never heard of the disease before whilst only 28.4%

knew that the disease affects skin and bone. Concerning the etiology of BU, 45.6% averred that BU was caused by germ and 32.6% opined that living near river bodies was a major risk factor associated with the disease. These findings might suggest why there was high prevalence of BU cases in the Sekyere Afram Plains District because most people in the area did not know the cause, mode of transmission and the prevention of BU. Also, the low level of knowledge on BU could be as a result of health workers inability to educate the people on the BU. Since mode of transmission is not scientifically clear, individuals need to be told about the risk factors and the various interventions available. This low level of knowledge on Buruli ulcer is in sharp contrast with a study by Ackumey (2013), where more than two-thirds of adults in Ga West had an awareness of BUD and consider it a major health problem.

However, findings of this study are consistent with Renzaho et al. (2017) in a study at the Ga East District where they asserted that the community members in that locality lacked a better understanding of the causes of the BU disease. Furthermore, the findings are not in line with Nwafor (2019) on the assessment of community knowledge, attitude, and stigma of Buruli ulcer disease, which results showed that only 35.0% of the participants had a good knowledge of Buruli ulcer disease. It was concluded that there was poor community knowledge on Buruli ulcer disease in endemic settings of Southern Nigeria which influenced the attitude and perceptions of community members towards persons with Buruli ulcer disease. The inconsistencies in the findings of the various studies and the current one could be due to lack clarity of health workers on Buruli ulcer disease causes and mode of transmission since there are so many myths and misconceptions about Buruli ulcer disease.

The results also revealed some perceptions by patients and family members on Buruli ulcer disease. Some of the respondents attributed Buruli ulcer disease to witchcraft or some magical powers as the cause. This finding supports Moe et al (2012) study in Asutifi South District, that most BU infected people associate the cause of Buruli ulcer disease to witchcraft and other primitive causes, hence, prefer to seek treatment from herbalists or spiritualist rather that hospital health care. Another study by Akoachere, Nsai, and Ndip, (2016) corroborated the findings in this study and identified that although the majority of respondents stated the hospital as the place for appropriate treatment, some BU victims preferred witchdoctors/herbalists and prayers, and considered the hospital as the last option. The similarities in findings could be due to the

chronicity of the disease since most of the chronic conditions are associated with witchcraft in most Ghanaian societies.

4.2 Association between knowledge and demographic characteristics of respondents

It was found that sex and educational level had association with knowledge on Buruli ulcer. However, no association was found between demographic characteristics: age, marital status, religion, and occupation and knowledge on Buruli ulcer. Result concurs with a study [2] who revealed educational status and ethnicity to be independent predictors of knowledge of BUD. They found that all levels of formal education were predictors of knowledge on BUD. Improved education of community members could contribute to easy dissemination of information. The role of education in improved community knowledge of BUD has been shown by studies in Ghana and Cameroun [1]; [4]; [9]. Education remains a key instrument in driving social change and helps in changing one's perception about a disease e.g., acceptance of Buruli ulcer disease patients by community members. People with higher education are expected to have increased knowledge in BU and thus influence the use of modern health care, and this study has identified that. Respondents with basic education had low knowledge about BUD compared to people with higher education. This is in line with a related study which stated that the level of education determines the knowledge level and hence, the treatment option for respondents on Buruli ulcer [6].

However, the findings contradict [10] noting that Buruli ulcer is prevalent in children under the age of 15, in many traditional settings specific age groups (mostly elderly, sometimes children) prefer traditional practitioner consultation, but age in this current study has not been found to be significantly associated with knowledge. This confirms an earlier study that found that age and sex often have a discriminatory function in knowledge and choosing between traditional and modern health care and that the choice of modern services appears to be less dependent on the age of the people affected [17].

Respondents in the current study engaged in different forms of occupation; most of them were farmers. However, it was observed that there was no significant association between the occupation of respondents and their knowledge on Buruli ulcer disease. Buruli ulcer tends to be economic perspective, and it is a consequence of poverty in most of the affected communities, occupation of respondents in most cases determines the income level. The cost of care for patients with Buruli ulcer is heavy especially patients who live far distance away from health

care (cost of travelling). This is in support with a study that found that the cost of treatment and management of BU inflicted a very heavy financial burden on poor households than the rich [3]. Furthermore, it was anticipated that Christians and Muslims, based on their religious beliefs, religion should have a positive association with the knowledge on BU, however, this study found that religion was not statistically associated with the knowledge of the participants on BU. Another study corroborated the findings of this study and identified that although the majority of respondents stated the hospital as the place for appropriate treatment, some BU victims preferred witchdoctors/herbalists and prayers, and considered the hospital as the last option which was not statistically significant [11].

4.3 Availability of drugs, diagnostic materials and support for Buruli ulcer patients

The third objective determined the availability of drugs, diagnostic materials and support for Buruli ulcer disease management. Findings showed that majority of the respondents were inactive members of NHIS and were also unaware (81.0%) that the cost of treatment of Buruli ulcer was free. Being inactive members of NHIS could negatively impact on their health-seeking behaviour and may be a justification for BU patients opting for self-medication or resorting to herbal remedies. This finding concurs with a study conducted by [15] where they unequivocally stated that 71% of the respondents prefer traditional medicine to orthodox medication.

The National Buruli Ulcer Programme in collaboration with its development partners had removed all bottlenecks associated with BU management and deliberately made the cost of treatment free. The objective was to ensure treatment compliance and improve the management of BU in the country. Although the study showed a colossal (68.2%) failed to report at the health facility, 78% admitted that the health facility could manage their condition better. This has been confirmed in a study which found that access to health services encouraged timely treatment of Buruli ulcer patients [11].

Regarding the frequency of wound dressing and care, the findings revealed that an insignificant number (16.7%) dress their wounds daily, albeit some stated bi-weekly (26.2%) and weekly (57.1%). Wound care and hygiene speed up the healing process and it is imperative to dress the wound daily. The patient might as well prevent secondary infection and protect pre-existing wound. BU patients need to be educated to wear trousers and long-sleeved shirt to also serve as a preventive measure. All the respondents stated emphatically that they were unable to afford the cost of transportation from their place of abode to the health facility. Probably this may be an

indication why majority of the respondents could not comply with the daily wound dressing at the health facility. Inability to cope with the daily dressing could be due to the distance to the nearest treatment site is a major determinant of care choice, but this study did not assess that. A similar study found, however, that living near a health facility increases the likelihood of seeking care [17].

The entire treatment of BU is free, however, there are other costs including transport, feeding and the purchase of other drugs to treat other underlining infections, and therefore this makes the cost of treatment a major determinant of the choice of treatment. This study found that most of the respondents could not afford the transportation cost to the health facilities for daily dressing. This agrees with a study that stated that factors causing delay in hospital treatment were the use of traditional medicine prior to presentation at the treatment center, the cost, transportation and duration of admission [4]. Since transportation cost has been associated with daily dressing of the patients' wounds measures like treatment support could be instituted in the care of these patients. This treatment supported could be trained on wound dressing to the patients at home to reduce the daily travel to the hospital or health centers for wound dressing.

Provision of enabler's package to BU patients was irregular and unreliable. The study revealed that 11.9% never received any funds as transportation to support their visit to the health facility for wound dressing. Other patients stated that they received it monthly (26.2%) whilst others had it quarterly (61.9%). There is the need to review the intervention regarding the frequency and identify alternative sources to sustain the intervention in the district. This finding is inconsistent with a study conducted by [8] on Enhancing BU Control in Ghana through social interventions.

4.4 The capacity of health staff to manage Buruli ulcer disease

The fourth objective assessed the capacity of health staff to manage Buruli ulcer. The findings revealed that health care workers had never received any refresher training, even though they were actively involved in intensified case finding and screening. This is indicative of the fact that despite the challenge, health care workers are committed to the fight against Buruli ulcer. There is the need to strengthen their skills, knowledge and competencies regularly so that they can effectively manage cases. This finding supports [18] who found out that the decision to either self-medicate, go to health facility or seek the services of traditional healers and spiritualists is due to the competence level of the health workers in managing the their conditions. According to [20], the traditional system accounts for up to 80% of the world's population as the first point of

call when it comes to skin problems. It has been found that traditional health practitioners are useful and will continue to be used by many in the developing countries for skin diseases because they are accessible, available and affordable as well as cultural imperative to consult them. For the health workers to take over these responsibilities from the traditional health practitioners, adequate training and skills are needed to manage the wounds effectively. In relation to diagnostic equipment for BU, it was found that they were not adequate. Majority of health care workers (70.4%) opined that the supply was erratic at the health facility. Sometimes supplies are based on demand, thus if a case was detected they had to wait for feedback from one of the reference laboratory in the country.

With regards to compliance, all health workers interviewed stated that patients were unable to complete the 8 weeks drug regimen as well as wound dressing. However, health care workers made conscious efforts to trace them during community outreach including home visit and child welfare clinic. This result confirms other studies that the deliberate introduction of social interventions tremendously improved treatment compliance [41]. This is in contrast with [30] whose study found that many of the Buruli ulcer patients depended hugely on over-the-counter drugs in addition to seeking help from traditionalists and spiritualists but not the health care facilities.

4.5 Limitations

The cross-sectional study design adopted did not establish cause and effect relationship and was susceptible to recall bias. Since a smaller sample size was used for the study, the results cannot be accurately interpreted for a generalized population. However, there were varied views or opinions from BU patients, community members and health care workers which made the study fair and objective. Although the responses elicited pointed to the right direction, it was inadequate.

5 Conclusion

This study found low knowledge on Buruli ulcer in the selected endemic districts and this influenced respondents' choice of place for treatment. Variables including sex and educational level of the respondents were significantly associated with the knowledge on Buruli ulcer whilst age, marital status, religion, and occupation were not significant. The health care workers did not receive refresher training on the management of BU disease. The study concludes that if health workers are trained on Buruli ulcer and more education is given to the community members on

Buruli ulcer disease, the management of the disease would be improved to reduce complications associated with Buruli ulcer disease in the Sekyere Afram Plains District. Also, if adequate logistics and drugs are provided, patients would comply with the treatment regimen of the condition.

6 Recommendations

i. Ministry of Health through Ghana Health Service should organize training and refresher courses for health care workers and community-based surveillance volunteers to increase their knowledge on Buruli ulcer.
ii. Health workers should intensify health education in their catchment areas to demystify Buruli ulcer disease.
iii. Government should introduce an enabler's package in the form of transportation to BU patients to ameliorate Buruli ulcer management.
iv. Government should motivate health staff who are involved in case management through regular supply of drugs and logistics and provision of incentives.
v. Further research should be conducted on other factors that influence the knowledge and health seeking behaviour of Buruli ulcer patients.

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