# SEROPREVALENCE OF HIV, HBV, HCV AND SYPHILIS AND ASSOCIATED RISK FACTORS IN THE FISHING COMMUNITY IN MWANZA REGION, TANZANIA-2012

**By**

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**Muhimbili University of Health and Allied Sciences**

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## CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled **Seroprevalence of HIV, HBV, HCV and syphilis and associated risk factors in fishing communities in Mwanza, Tanzania** in (Partial) fulfilment of the requirements for the degree of Master of Science in Epidemiology and Laboratory Management of Muhimbili University of Health and Allied Sciences.

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## DEDICATION

I would like to express my sincere appreciation to my dear wife, **Sylvia C.S Almas** for her encouragement and support during the study period.

## ABBREVIATIONS

| | |
|---|---|
| **MUHAS** | Muhimbili University of Health and Allied Sciences |
| **TFELTP** | Tanzania Field Epidemiology and Laboratory Training Programme |
| **AOR** | Adjusted Odds Ratio |
| **USA** | United States of America |
| **HIV 1/2** | Human immunodeficiency virus 1 or 2 |
| **HBV** | Hepatitis B Virus |
| **HCV** | Hepatitis C Virus |
| **DNA** | Deoxyribonucleic acid |
| **BMC** | Bugando Medical Centre |
| **HBsAg** | Hepatitis B surface antigen |
| **HBeAg** | Hepatitis B e antigen |
| **IgM** | Immunoglobulin M |
| **RPR** | Rapid plasma reagin |
| **STIs** | Sexually transmitted infections |
| **OR** | Odds ratio |
| **ml** | Millilitres |
| **Rev/min** | Revolutions per minute |

## Abstract

**Background**: Fishing communities have been identified among the vulnerable groups at high risk for acquiring sexually transmitted infections. This vulnerability is mainly due to their mobility, time away from home, access to cash income and commercial sex at landing sites. Data on prevalence and associated factors for sexually transmitted infections in fishing communities is limited.

**Objective**: To determine the seroprevalence of human immunodeficiency virus infection (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) infections and syphilis and the associated risk factors in the fishing communities.

**Methodology**: This was a cross sectional community-based study conducted at Mwaloni landing site along the shores of Lake Victoria basin in Mwanza region conducted between October 2012 and March 2013. Information on socio-demographic characteristics and factors associated with acquisition of HIV, HBV, HCV and syphilis were obtained using a structured questionnaire. Blood samples were collected and screened for HIV, HBV, HCV and syphilis. Multivariate logistic regression was performed to determine the risk factors for acquisition of infections. A p-value of $\leq 0.05$ was considered statistically significant.

**Results:** A total of 448 individuals were included in the study. The mean age was 33.5 years (range 18-70 years). Many participants (61.2%) were males and (70.5%) had primary education. Of participants 235 (52.5%) were fish traders. The prevalence of HIV, HBV, HCV and syphilis were found to be 9.8%, 9.2%, 5.6% and 14.3%, respectively. Regular alcohol consumption was found to be a risk factor for acquiring HIV infection (OR=4.4, 95%CI=1.7-11.8) in the fishing community. Study participants who had used the health services in the past one year were more likely to have HIV infection (OR=3.8, 95%CI=1.9-7.4) Health services were accessible within a distance of five kilometres and 29.5% of the study respondents had used these services in the past twelve months.

**Conclusions:** The prevalence of STIs in the fishing community was found to be higher compared to the prevalence figures of STIs in Tanzania for the general population. Regular alcohol consumption was found to be a risk factor for acquiring HIV in the fishing community. Utilization of health services in the fishing community was found to be low.

**Recommendations:** Health education targeting reduction of alcohol consumption in fishing communities should be emphasized. Mobile health services focusing on prevention and treatment of STIs in fishing communities are needed to prevent transmission of STIs in these communities.

# CHAPTER ONE

## 1.0 INTRODUCTION AND BACKGROUND

### 1.1 Background

Human immunodeficiency virus (HIV) belongs to the retrovirus family that causes AIDS, a condition resulting into progressive deterioration of the immune system allowing life threatening diseases, opportunistic infections and cancers to occur [(1)]. HIV-1 infection is associated with most of the global AIDS pandemic while HIV-2 has been described in pockets of locations in the world [(2)]. HIV-2 was first discovered in 1985 in West Africa [(3)]. HIV is mainly transmitted through unsafe sex with an infected person, contaminated instruments, mother to child transmission may occur through breast milk and through the placenta or during delivery. Sexual transmission of HIV accounts for the majority of cases of HIV infection worldwide through exposure to fluids that contain HIV such as blood, semen, vaginal fluids or rectal fluids. HIV infects cells of the immune system (T-cells, macrophages and dendritic cells) causing diminished levels of CD4 T-cells by direct killing of infected cells, increasing the rate of apoptosis in infected cells and killing of infected cells by CD8 (cytotoxic T- lymphocytes) which directly destroy infected cells [(4)]. At the end of 2011, about 34 million people were living with HIV in the world, with two thirds of them living in sub-Saharan Africa. This reflects the continued large number of new infections and significant expansion of access to antiretroviral therapy, which helped reduce AIDS deaths, especially in more recent years[(5)]. The number of people dying of AIDS-related causes fell to 1.7 million in 2011, down from a peak of 2.2 million in the mid-2000, in 2012 alone 700,000 AIDS related deaths were recorded[(5)]. Globally the percentage of women with HIV infection has remained constant at 50% while adolescents and young adults in the age group ranging between 15 and 24 years accounts for about 45% of new HIV infections in the world [(6)].

Hepatitis B is an illness caused by hepatitis B virus (HBV) which infects the liver cells causing inflammation. HBV is a DNA virus belonging to the family hepadnaviridae [(7)]. HBV is more infectious than HIV and HCV [(8)].About one third of the population in the world has been infected with HBV and about 350 million people of the world's population are chronic carriers of HBV [(9)].

Hepatitis C is an infectious disease infecting liver cells caused by hepatitis C virus (HCV) which basically spread through blood to blood contact [10] .It has been estimated that about 170 million people in the world are infected with HCV [11]. Countries which have been reported to have the highest prevalence of HCV are found in Africa and Asia [12].

Syphilis is a bacterial disease caused by *Treponema* (resembling a twisted thread) *pallidum* (pale in colour) which can be spread by sexual intercourse, blood transfusion and from the mother to the child [13].It has been reported that about 340 million new cases of syphilis occurred throughout the world in men and women in the age group ranging between 15 and 49 years [14].

Co-infection with HIV, HBV, HCV and syphilis may occur. Studies conducted in Ethiopia [15], Nigeria, Slovenia, Kano and Abuja [16] reported a higher prevalence of HCV infection in HIV positive individuals. In Keffi, a neighbouring city of Abuja, HCV infection in HIV positive persons was found to be 11.1% [17] .Another study done in Keffi, North-Central Nigeria demonstrated higher prevalence (20.6%) of HBV infection in HIV positive individuals. A similar study done in USA reported that about 1.5% and 4.9% of HIV positive pregnant women were infected with HBV and HCV respectively [18].

**1.2 Statement of the problem**

Fishing communities have been identified to be among the high risk groups in acquiring STIs. Fishing communities are quite dynamic; such dynamism is likely to diversify risk factors associated with STIs acquisition. Any kind of profession involving mobility and being away from home, such as fishing is much more likely to make the people vulnerable to getting infected with STIs. Due to the nature of their work, it has been very difficult to be captured in specific interventions for prevention and treatment of STIs. Fishing communities have social, economic and life style characteristics which are likely to predispose them to higher risk of infection than the general population. Previous seroprevalence surveys have not highlighted the prevalence of STIs and associated risk factors in specific high risk groups such as the fishing communities in the Lake Victoria basin. Moreover, there were scanty published reports on the seroprevalence of STIs, socio-demographic, behavioural risks, availability and utilization of specific services for prevention and treatment of STIs in our fishing communities. The findings of this study would generate an understanding of the impact of STIs on these populations so as to guide appropriate interventions, determine and

guide the designing of necessary specific interventions that need to be put in place to reduce the risks and vulnerability of STIs transmission among the fishing communities. The findings would also be useful in determining a framework for improving the effectiveness of STIs responses among the fishing communities.

### 1.3 Study rationale

In Tanzania the information on prevalence and the associated risk factors for acquiring STIs in our fishing communities is minimal despite the vulnerability of fishing communities to STIs. This study was conducted to determine the seroprevalence of HIV, HBV, HCV infection and syphilis and the associated risk factors in the fishing community in Mwanza region at Mwaloni landing site. Studies done in Uganda, Kenya, Cambodia and other parts of the world targeted only men in fish catching operations (fishermen), while all individuals working in close association with fishermen are equally at risk. Since these infections are more likely to be associated with stigma in the society, the infected individuals may not seek appropriate medical attention or intervention. This study, therefore, focused on fishermen and individuals working in close association with fishermen (fish traders and people cooking for the fishing community).

### 1.4 Research Hypothesis

Fishing communities have a higher prevalence of STIs compared to the general population.

### 1.5 Research questions

1.5.1 What is the magnitude of HIV infection, HBV, HCV and syphilis in the fishing community at Mwaloni landing site?

1.5.2 What are the socio-demographic and behavioural risk factors associated with HIV, HBV, HCV infection and syphilis at Mwaloni landing site?

1.5.3 What is the proportion of individuals co-infected with HIV, HBV, HCV and syphilis?

1.5.4 Are health services for prevention and treatment of STIs available and utilized in the study area?

## 1.6 Objectives

### 1.6.1 Broad objective

To determine the seroprevalence of HIV, HBV,HCV infection and syphilis and the associated risk factors among the fishing community at Mwaloni landing site along the shores of Lake Victoria basin in Mwanza region.

### 1.6.2 Specific objectives

1.6.2.1 To determine the prevalence of HIV infection, HBV, HCV and syphilis in the fishing community at Mwaloni landing site.

1.6.2.2 To determine the socio-demographic and behavioural risk factors associated with HIV, HBV, HCV infection and syphilis in the fishing community at Mwaloni landing site.

1.6.2.3 To determine the proportion of individuals co-infected with HIV, HBV, HCV and syphilis in the fishing community at Mwaloni landing site.

1.6.2.4 To determine the availability and utilization of health services for prevention and treatment of sexually transmitted infections in the study area.

# CHAPTER TWO

## 2.0 LITERATURE REVIEW

### 2.1 HIV infection

In Tanzania, the prevalence of HIV has been estimated to be about 5.1% [19] with 1.2 million people with the age of 15 years and above infected with HIV [22].However, the magnitude of HIV infection varies with geographic locations. In 2012, the prevalence of HIV was reported to be 0.3% in Kaskazini Pemba and was reported to be as high as 14.8% in Njombe [19]. In Mwanza region, the prevalence of HIV infection was estimated to be 4.8% in the general population [19]. In Uganda, the prevalence of HIV was estimated to be 5.4% in 2012 and 6.4% in Kenya [21]. About 1.2 million people with the age of 15 years and above are infected with HIV in Tanzania [22]. The prevalence of sexually transmitted infections (STIs) has been found to differ from one country to another and among different groups within the same country [24]. HIV prevalence in some fishing communities in different countries is higher compared to the National average seroprevalence figures [25]. Most of the studies supporting this argument refer to fishermen although men and women working in associated occupations such as fish trading, fish processing, building boats, repairing nets and boats or cooking for the fishing community are also vulnerable to STIs acquisition because they are often within the sexual networks of fishermen [26]. Due to the nature of their work, there are some evidences that the fishing communities are more likely to be infected with HIV and other STIs. They spend a long time outside their places of residence and most interventions for prevention and treatment of STIs have not been able to reach them. They are highly mobile and are also engaged in risky behaviour which predisposes them to STIs.

Most people involved in fishing activities are within the age group ranging between 15 and 35 years which is the age group most vulnerable to acquiring STIs. Alcohol use has been found to be wide spread among the fishing communities in many parts of the world as the way of trying to cope with the difficulties associated with their work. This further increases the risk of acquiring STIs among the fishing communities. These communities are also vulnerable to STIs due to insufficient prevention strategies in their work places, limited treatment measures and access to sexual health services [27]. Recent findings have revealed a higher prevalence of HIV infection in certain fishing communities around the world. About 13-20% of fishermen in Thailand were HIV positive in the late 1990s, 8% of adults in the

fishing communities of Galifunda in Honduras tested HIV positive and 12% of people infected with HIV in USA during 1990-1995 belonged to the fishing communities [28]. A cross sectional study among fishermen which was conducted in Cambodia reported the prevalence of HIV to be about 16.1% which was more than twice the National HIV prevalence [29]. A study conducted in Uganda in 2012 among the fishing communities estimated the prevalence of HIV to be 28.8% which was higher than the National prevalence among adults (5.4%) and the prevalence of active syphilis was estimated to be 4.3%[21] and high risk sexual behaviour was frequently reported by the study respondents [30]. A similar study done in Kenya in 2010 estimated the prevalence of HIV infection to be 26% among fishermen from Lake Victoria at Kisumu [31]. A field assessment conducted by the International Organization of Migration (IOM) in 2010 found that fishermen were more likely to have multiple sexual partners and less likely to use condoms compared to the general population. In areas bordering Lakes of Tanzania, one in five people are HIV positive and access to treatment, utilization of health services and prevention strategies in these areas is minimal [32].

Factors such as young age, unmarried status, multiple sexual partners, lack of and/or inconsistent use of condoms, regular alcohol consumption have been found to be linked with increased vulnerability of fishing communities to HIV infection and other STIs [33]. The risk factors predisposing the fishing communities to HIV infection and other STIs should not be considered as the characteristic of all fishing communities but it has been noted through several studies, to be wide spread enough to cause concern that the fishing communities and their sexual partners are at significant risk of HIV infection and other STIs. This has been reported in Asian, African and American countries where about 95% of 200 million men and women of the world's fishermen, fish processors and fish traders live [34].

### 2.2 HBV infection

About 350 million people are believed to be infected with HBV in the world [35]. Among the estimated 40 million persons infected with HIV in the world, about two to four million have chronic HBV infection [36]. HBV has been detected in cells of the peripheral blood, cells of the pancreas, spleen, kidney, skin and body fluids like saliva, semen, sweat, breast milk, tears, urine and vaginal secretions [37]. HBV is transmitted in the same way as HIV [38]. The presence HBeAg in human blood indicates that the virus is in the stage of active multiplication. Without intervention, a mother who is positive for hepatitis B surface antigen

(HBsAg) has a risk of about 20% of passing on the infection to her child at the time of birth. The risk of passing the infection to the child is about 90% if the mother is also positive for hepatitis B e antigen (HBeAg) [39]. About 90% of infants who become infected with HBV from their mothers at birth develop chronic infections, whereas 30% to 50% of children who are infected at the age of one to five years become chronically infected. Approximately 5% of adults who acquire acute HBV infections progress to chronic infection [40]. The prevalence of HBV infection in Tanzania has been estimated to be about 4.2% in individuals negative for human immunodeficiency virus [41], 9.9% in the general population and about 17% in HIV infected individuals [42].

### 2.3 HCV infection

It has been estimated that about 27% of liver cirrhosis and 25% of hepatocellular carcinoma in the world are due to HCV infection [43]. The virus is found in body fluids such as semen [44] and saliva [45]. About 80% of individuals exposed to HCV are chronically infected [46]. The risk of passing the virus from the mother to her child is 6% if the mother is only HCV positive. This risk increases to about 25% if the mother is HCV/HIV positive [47]. The current estimated global prevalence of HCV infection is about 2.2% which is approximately equal to about 170 million people worldwide and about four to five million people are chronically infected with HCV [48]. The prevalence in Sub-Saharan Africa is about 5.3% [49]. The prevalence of HCV has been estimated to be 6.6% in Uganda and it has been estimated to be about 3.2% in Tanzania [50].

### 2.4 Syphilis

Syphilis is believed to have infected 12 million people worldwide, with greater than 90% of the cases in the developing world [51]. WHO estimated that one million pregnancies are affected by syphilis each year worldwide [52]. In Africa it has been found that about 3-17% of pregnant women had serological evidence of syphilis [53]. Syphilis in pregnant women is associated with low birth weight, prematurity and intrauterine death [54]. In Tanzania previous surveys revealed a prevalence of active syphilis of about 2.7% in a general outpatient group [55]. In Uganda the prevalence of syphilis was estimated to be about 2% in 2011 [56].

**2.5 HIV, HBV, HCV and syphilis co-infection.**

Infection with HIV and HBV or HCV represents a major epidemic globally. Co-infection is characterized by a more rapid progression towards end stage of liver disease leading to increased morbidity and mortality [(57)]. In USA 6.3% has been reported to be the overall prevalence of HIV and HBV or HCV co-infection among pregnant women with 1.5% and 4.9% co-infected with HBV and HCV respectively [(58)]. A previous study conducted in Addis Ababa, Ethiopia, estimated HCV antibody prevalence of 0.9% and higher among HIV positive individuals compared to HIV-negative individuals[(59)]. In Slovenia, the overall prevalence of HCV infection in HIV-positive persons was reported to be 16.9% [(60)].In Nigeria, the prevalence of HIV and HCV co-infection has been reported to be 6.2% in Kano and in Abuja was estimated to be 12.5% [(60)]. In Keffi which is a neighbouring city to Abuja, the prevalence of HIV and HCV co-infection was found to be 11.1%. A higher prevalence of about 20.6% was reported among persons with HIV/HBV co-infection in Keffi, North-Central Nigeria [(61)]. In Uganda and Rwanda, about 6% of HIV positive pregnant women were co-infected with either HBV or HCV [(62)].

# CHAPTER THREE

## 3.0 METHODOLOGY

### 3.1 Study design

This was a cross sectional community-based study to determine the seroprevalence of HIV, HBV, HCV and syphilis and associated risk factors among the fishing community along the shores of Lake Victoria basin in Mwanza region.

### 3.2 Study period

This study was conducted from October 2012 to March 2013.

### 3.3 Study site

The study site for the fishing community was Mwaloni fish landing site along the shores of Lake Victoria basin in Mwanza Region. Mwanza is located on the southern shores of Lake Victoria covering an area of 20,095km$^2$ with a population of 2,000,000 according to the 2012 census. The landing site is a point at the shore of the lake where the fishing boats stop to offload fish for sale and small scale processing of fish. Other small scale businesses also flourish at the landing site. Mwaloni is the largest fish landing site in Mwanza region where there are bigger interacting fishing communities. It started in 1950s with the purpose of serving local fishermen. There is a big influx of people and tracks that come to buy fish for home consumption and for industrial processing. About fifty vessels stop at the site per day to offload fish for sale. It is located about 3 kilometres from the city centre. It has an approximate population of 2,000 but people do not permanently stay at Mwaloni as they keep moving from one landing site to the next depending on fish availability.

### 3.4 Study population

The study population was the fishing community. The fishing community includes fishermen and those who are in close association with the fishermen within a given geographical coverage, that is, residing or working within the landing site and earning their livelihoods from such activities. The fishing community therefore includes fishermen, fish traders and cooks.

### 3.4.1 Inclusion criteria

All persons aged 18 years and above working in the landing site in different job categories who consented to participate in the study.

### 3.4.2 Exclusion criteria

All persons aged 18 years and above living or working in the landing site who did not give consent to participate in the study.

### 3.5 Sample size estimation

The formula of Kish and Lisle (1965) [63] was used to calculate the sample size

$$n=\frac{Z^2P\,(100-P)}{\varepsilon^2}$$

Where Z=Z score for 95% Confidence Interval=1.96, P=Prevalence and ε=Maximum tolerable error.

The prevalence which was used to calculate the sample size was that of syphilis which was the smallest prevalence compared to HIV, HBV and HCV. This prevalence was used so as to obtain the minimum sample size because of budget limitations. The prevalence of syphilis was 2.7% [55] and ε, the maximum tolerable error, was estimated to be 1.5%

Therefore the sample size was:-

$$n=\frac{(1.96)^2 x2.7x\,(100-2.7)}{1.5^2}$$

$$n=\frac{3.84x2.7x97.3}{2.25}$$

$$n = 448$$

### 3.6 Sampling technique

Since the study involved several job categories in the fishing community (fishermen, fish traders and individuals cooking for the fishing community), the number to be enrolled from each group was determined using the probability proportional to size (PPS) to allocate the calculated sample size to the different job categories.

A list of individuals working in the fish landing site was obtained from the Beach Management Unit (BMU) chairperson then a total number (T) of individuals working in the

landing site was determined. After obtaining the list from the BMU, the list was updated and a total of 621 individuals working in the landing site were registered. Among 621 individuals, 76 were cooks, 326 were fish traders and 219 were fishermen.

In order to allocate proportionate to the size of each job category the formula below was used (**HIV&AIDS Baseline Sero-behavioural study among fishing communities in Lake Victoria-Kenya, 2010-Unpublished**).

$$\frac{AXS}{T} = B$$

Where;

**A**=Total number of individuals in each job category

**S**= Sample size (448)

**B** = Number of individuals recruited from each category

**T**= Total number of individuals in the fishing community

The following numbers of individuals were enrolled from different job categories:-

**Fish traders:** 326x448/621= 235

**Fishermen:** 219x448/621= 158

**Cooks:** 76x448/621 = 55

After determining the number of study participants to be enrolled from each job category, simple random sampling technique was used to identify individuals from each job category to be enrolled. This was done by listing down individuals in each job category and allocating numbers and then random numbers which determined the study participants to be enrolled were generated using OpenEpi version 2.2.1.

### 3.7 Data collection and management

Information on risk factors associated with HIV infection and the selected sexually transmitted infections (HBV, HCV and syphilis) such as multiple sexual partners, alcohol use or drugs, lack of condom use and information on socio-demographic factors such as age, sex, marital status and education level were obtained using a structured questionnaire. Information

was collected by the counsellor nurses during pre-test counselling and the forms were inspected for completeness every day before leaving the site.

## 3.8 LABORATORY INVESTIGATIONS

### 3.8.1 Sample collection and labelling

Four millilitres (4ml) of a blood sample were obtained from each study participant using a plain vacutainer tube on the same day of enrolment. A unique identification number was written on the blood sample tube and the same number was written on the questionnaire of the same individual.

### 3.8.2 Sample processing and testing

HIV testing was done at the site using whole blood. The rest of the samples were transported in cool boxes to Bugando Medical Centre (BMC) laboratory for processing. Blood samples were centrifuged at 1,500rev/min for 15 minutes to obtain serum. Sera were then stored at -20°C freezer until the time of testing. HBV, HCV and syphilis testing was performed in BMC laboratory.

### 3.8.3 HIV testing

HIV testing was done by nurse counsellors at the site after pre-test counselling. Testing was done using Determine$^{TM}$ HIV-1/2 assay (Inverness Medical Japan Co. Ltd, Japan) **(64)**. For study purposes and in accordance with National algorithm for diagnostic HIV testing, blood samples which tested positive to the first test were subjected to a second rapid assay Uni-Gold$^{TM}$ HIV-1/2 (Trinity Biotech, Wicklow, Ireland)**(64)**.

### 3.8.4 HBV testing

Screening of HBsAg was done by using quality assured Determine HBsAg test strips (Abon Biopharm-Hangzhou Co Ltd, China). This is a qualitative immunoassay for the detection of HBsAg in whole blood, serum or plasma. The test procedure was carried out and interpreted according to the manufacturer's instructions.

### 3.8.5 HCV testing

Hepatitis C antibody detection was done using quality assured rapid tests, SD bioline HCV (Abon Biopharm-Hangzhou Co Ltd, China). This is an immunochromatographic rapid test for the qualitative detection of antibodies specific to HCV in human serum, plasma or whole blood. The test procedure was carried out and interpreted according to the manufacturer's instructions.

### 3.8.6 Syphilis testing

Syphilis screening was done using rapid plasma reagin card tests (RPR-Omega Diagnostics Ltd, India) [(64)]. This is a modified version of Wassermann's reaction in which the antigens coated with carbon particles are allowed to react with the sample resulting into flocculation formation with the sample if antibodies against syphilis are present. Positive and negative controls were also included in each run to ensure accuracy and reliability of results.

### 3.9 Data analysis

Data were entered and analyzed using Epi-Info version 3.5.4. The seroprevalence of HIV, HBV, HCV and Syphilis were expressed in percentages. Pearson's Chi-square method was used to determine risk factors associated with positive test results of HIV, HBV, HCV infection and syphilis. However, where the numbers in a cell were less than 5, a Fisher's exact test was used. Risk factors detected by univariate analysis were inserted into multivariate logistical regression analysis to identify the risk factors. Odd ratios (OR) and the corresponding 95% confidence intervals (95% CI) were used to compare proportions in independent groups of categorical socio demographic, sexual and alcohol use behavioural variables. A p-value of $\leq 0.05$ was regarded to be statistically significant.

### 3.9.1 Ethical considerations

The study was conducted according to the existing ethical guidelines. Ethical approval was obtained from MUHAS Senate Research and Publications Committee. Written informed consent was obtained from each participant prior to the enrolment in the study. Pre and post test counselling was done by trained nurse counsellors. The permission to conduct this study was obtained from the Mwanza City Council Authority. The information that was obtained from this study was kept strictly confidential and study participants who were found to be HIV infected, HBV, HCV infected or to have Syphilis were referred to the health facilities of their own choice for appropriate management.

### 3.9.2 Study limitations

This was a prevalence study which could not establish the temporal relationship (cause-effect relationship) between exposure and STIs.

Fish processors, boat builders and repairers including net repairers were not enrolled in this study. These are the highly mobile groups, fish processors keep on moving from one landing site to the next depending on fish availability. Boat builders, repairers and net repairers are moving through all Regions of the Lake zone including islands for service provision.

It was not possible to do Hepatitis B core antibody and HBeAg which differentiate between acute infection and chronic carrier state. The presence HBeAg signifies that an infected person can easily pass on the virus to another individual. No confirmatory test was also done for syphilis and HCV because of budget limitations.

### 3.9.3 Dissemination of information

A copy of the dissertation will be shared with Mwanza City Council Authority. This is an authority which is directly responsible for designing and implementing preventive and treatment measures in the fishing community in Mwanza region. Results will be presented in workshops, symposium, scientific conferences and will be published in a peer review scientific journal.

# CHAPTER FOUR

## 4.0 RESULTS

### 4.1 Socio-demographic characteristics

A total of 448 participants were enrolled in the study. The response rate for interviews was 100% and also 100% for blood draw. The mean age was 33.5 years and the standard deviation was 10.2 with a range of 18-70 years. The age group of between 25 to 34 years comprised of 174 (38.8%). Majority of study participants had primary education 316 (70.5%). Of study participants 235 (52.5%) were fish traders, 158(35.3%) were fishermen while 55(12.3%) were cooks. Two hundred and ninety four (65.6%) were married or living with a partner **(Table 1).**

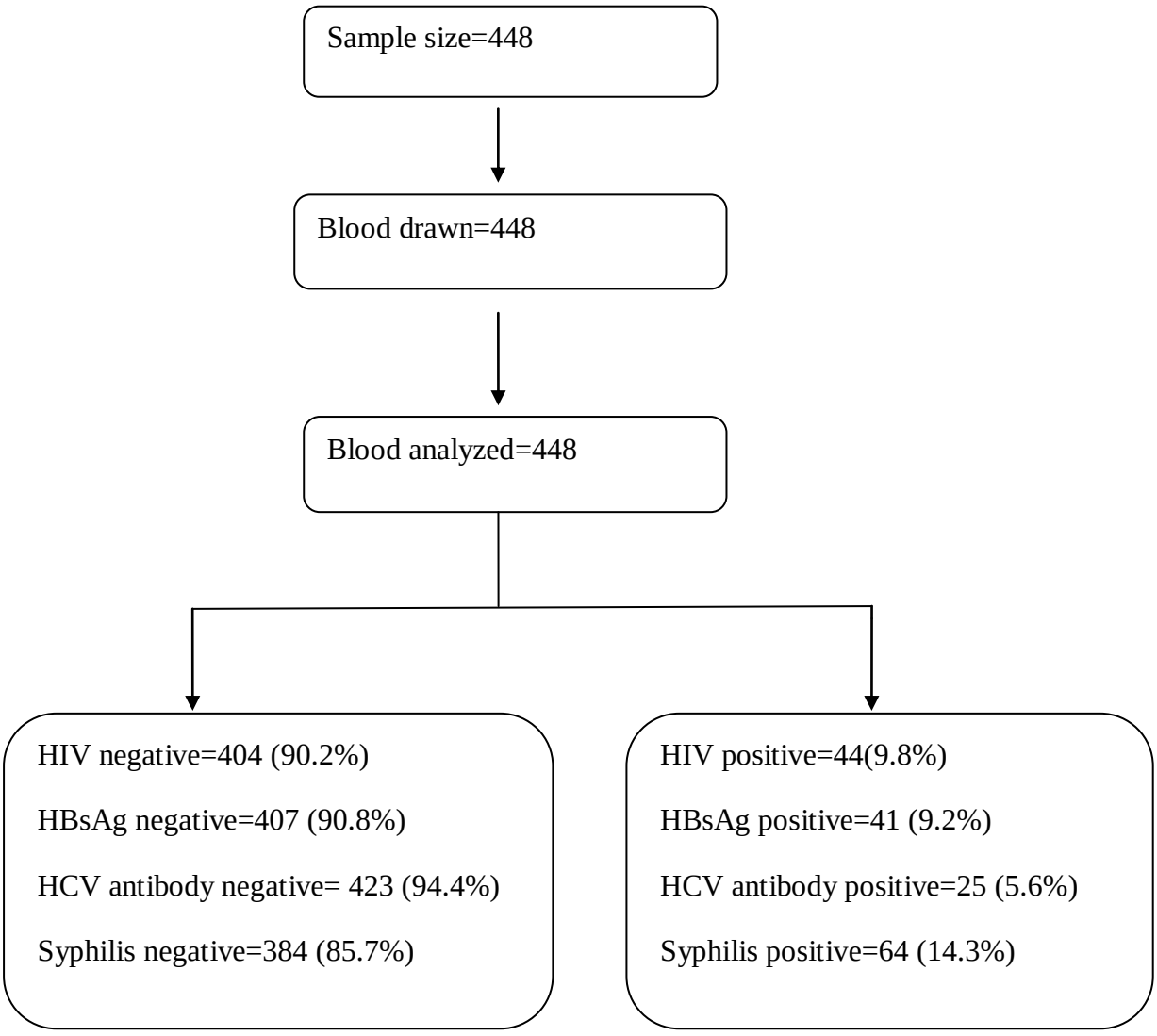
**Table 1: Baseline socio-demographic characteristics of individuals working in the fishing community (N=448) at Mwaloni in Mwanza Region.**

| Characteristics | Number % |
|---|---|
| **Age (years)** | |
| ≤ 24 | 91 (20.3) |
| 25-34 | 174 (38.8) |
| 35-44 | 113 (25.2) |
| 45 + | 70 (15.6) |
| **Sex** | |
| Male | 274 (61.2) |
| Female | 174 (38.8) |
| **Education level** | |
| Primary | 316 (70.5) |
| Secondary | 50 (11.2) |
| No formal education | 81 (18.1) |
| **Marital status** | |
| Single | 134 (29.9) |
| Married | 294 (65.6) |

### 4.2 Seroprevalence of HIV, HBV, HCV and syphilis

The seroprevalence of HIV, HBsAg, HCV and syphilis were 9.8% (7.3-13.1), 9.2% (95%CI=6.7-12.3), 5.6% (95%CI=3.7-8.2) and 14.3% (95%CI=11.2-18), respectively, **(Figure 1)**

**Figure 1:** Flow chart of the sample in the fishing community-2012



Of the study participants aged between 25 and 34, twenty (11.5%) tested HIV positive, thirteen (7.5%) tested positive for HCV antibody, 22(12.6%) had HBsAg positive while 25(14.4%) had positive syphilis test results. Many percentage of the study participants who tested syphilis positive were females 35(20.1%) **(Table 2).**

**Table 2: Prevalence of HIV, HCV, HBV and syphilis among study participants (N=448) by socio-demographic characteristics.**

| Variable | HIV +ve (%) | HCV + ve (%) | HBV + ve (%) | Syphilis + ve (%) |
|---|---|---|---|---|
| **Age (years)** | | | | |
| ≤ 24 | 15 (16.5) | 3 (3.3) | 10(11.0) | 4(4.4) |
| 25-34 | 20 (11.5) | 13(7.5) | 22(12.6) | 25(14.4) |
| 35-44 | 7(6.2) | 5(4.4) | 6(5.3) | 22(19.5) |
| 45+ | 2(2.9) | 4(5.7) | 3(4.3) | 13(18.6) |
| **Sex** | | | | |
| Males | 24(8.8) | 18(6.6) | 28(10.2) | 29(10.6) |
| Females | 20(11.5) | 7(4) | 13(7.5) | 35(20.1) |
| **Marital status** | | | | |
| Single | 18(13.4) | 8(6.0) | 13(9.7) | 17(12.7) |
| Married | 26(8.8) | 14(4.8) | 27(9.2) | 45(15.3) |
| **Job category** | | | | |
| Fishermen | 19(12) | 14(8.9) | 21(13.3) | 20(12.7) |
| Cooks | 9 (16.4) | 1(1.8) | 5(9.1) | 6(10.9) |
| Fish traders | 16(6.8) | 10(4.3) | 15(6.4) | 38(16.2) |

### 4.3 Socio-demographic risk factors for acquiring STIs in the fishing community

There was an association between HCV acquisition and study participants who were divorced, widowed or cohabiting (unmarried) but this was not statistically significant. (OR=3.8, 95%CI=0.9-14.4) **(Table 3).**

**Table 3: Socio-demographic risk factors for acquiring HCV**

| Characteristics | HCV +ve | HCV -ve | OR(95%CI) |
|---|---|---|---|
| **Age(years)** | | | |
| 25-34 | 13 | 161 | 2.4(0.7-8.5) |
| 35-44 | 5 | 108 | 1.4(0.3-3.5) |
| 45 + | 25 | 423 | 1.8(0.4-8.2) |
| ≤24 | 3 | 8 | Reference |
| **Sex** | | | |
| Males | 18 | 256 | 1.7(0.7-4.1) |
| Females | 7 | 167 | Reference |
| **Marital status** | | | |
| Unmarried | 3 | 16 | 3.8(0.9-14.4) |
| Single | 8 | 126 | 1.3(0.5-3.1) |
| Married | 14 | 281 | Reference |
| **Occupation** | | | |
| Fish traders | 10 | 225 | 2.4(0.3-19.1) |
| Fishermen | 14 | 144 | 5.3(0.7-40.8) |
| Cooks | 1 | 54 | Reference |
| **Education level** | | | |
| Primary | 16 | 300 | 0.7(0.3-1.8) |
| Secondary | 3 | 48 | 0.8(0.2-3.3) |
| No formal education | 6 | 75 | Reference |

**4.4 Socio-demographic risk factors for acquiring syphilis in the fishing community**

Study participants with the age ranging between 35 and 44 years were more likely to be infected with syphilis compared to other age groups (OR=5.3,95% CI=1.7-15.9) **(Table 4).**

**Table: 4 Socio- demographic risk factors for acquiring syphilis**

| Characteristics | Syphilis ( + ve ) | Syphilis ( - ve ) | OR (95% CI) |
|---|---|---|---|
| **Age (years)** | | | |
| 25-34 | 25 | 149 | 3.6 (1.2-10.8) |
| 35-44 | 22 | 91 | 5.3 (1.7-15.9) |
| 45 + | 13 | 57 | 4.9 (1.5-15.9) |
| ≤24 | 4 | 87 | Reference |
| **Sex** | | | |
| Males | 29 | 245 | 0.5 (0.3-0.8) |
| Females | 35 | 139 | Reference |
| **Marital status** | | | |
| Unmarried | 2 | 17 | 0.7 (0.2-2.9) |
| Single | 17 | 117 | 0.8 (0.4-1.5) |
| Married | 45 | 250 | Reference |
| **Occupation** | | | |
| Fishermen | 20 | 138 | 1.2 (0.4-3.1) |
| Fish traders | 38 | 197 | 1.6 (0.6-3.9) |
| Cooks | 6 | 49 | Reference |
| **Education level** | | | |
| Secondary | 8 | 43 | 0.5 (0.2-1.2) |
| Primary | 34 | 282 | 0.3 (0.2-0.6) |
| No formal education | 22 | 59 | Reference |

### 4.5 Socio-demographic risk factors for acquiring HIV in the fishing community

HIV infection was found to be associated with study participants who were single but this was not statistically significant (OR=1.6, 95%CI=0.6-3.7) **(Table 5)**

**Table 5.Socio-demographic risk factors for acquiring HIV**

| **Characteristics** | | **HIV +ve** | **HIV -ve** | **OR(95%CI)** |
|---|---|---|---|---|
| **Age(years)** | 25-34 | 20 | 154 | 0.7 (0.3-1.4) |
| | 35-44 | 7 | 106 | 0.4(0.2-1.2) |
| | 45 + | 2 | 68 | 0.2 (0.0-0.7) |
| | ≤24 | 15 | 76 | Reference |
| **Sex** | Males | 24 | 250 | 0.7 (0.4-1.4) |
| | Females | 20 | 154 | Reference |
| **Marital Status** | Unmarried | 0 | 19 | Undefined |
| | Single | 18 | 116 | 1.6 (0.8-3.1) |
| | Married | 26 | 269 | Reference |
| **Occupation** | Fish traders | 16 | 219 | 0.4 (0.2-0.9) |
| | Fishermen | 19 | 139 | 0.7 (0.3-1.7) |
| | Cooks | 9 | 46 | Reference |
| **Education level** | Primary | 34 | 282 | 1.5 (0.6-3.7) |
| | Secondary | 4 | 47 | 1.1 (0.3-3.9) |
| | No formal education | 6 | 75 | Reference |

### 4.6 Socio-demographic risk factors for acquiring HBV in the fishing community

None of the socio-demographic risk factors was found to be associated with the acquisition of HBV in the fishing community.

### 4.7 Behavioural characteristics

#### 4.7.1 Behavioural risk factors for acquiring HIV infection in the fishing community.

Behavioural characteristics which were found to predispose the fishing community to HIV infection were, lack of condom use, having sex with a non-regular partner (wife/husband) while drunk. Those taking alcohol on daily basis were more likely to be infected with HIV compared to those who took alcohol occasionally (OR=5.96, 95%CI=2.27-14.69). Those who had used the health services in the past one year were more likely to be HIV positive (OR=3.79, 95%CI=2.01-7.18) compared to the ones who did not. **(Table 6)**

**Table 6. Behavioural characteristics for acquiring HIV infection in the fishing community**

| Characteristics | HIV +ve | HIV -ve | OR (95% CI) |
|---|---|---|---|
| **Alcohol use** | | | |
| Yes | 27 | 157 | 2.49 (1.3-4.7) |
| No | 17 | 247 | |
| **Condom use** | | | |
| Yes | 16 | 67 | 2.87 (1.5-5.6) |
| No | 28 | 337 | |
| **Frequency of alcohol use** | | | |
| Daily | 10 | 19 | 5.96 (2.3-14.7) |
| Occasionally | 34 | 385 | |
| **Extramarital sex while drunk** | | | |
| Yes | 22 | 132 | 2.06 (1.1-3.9) |
| No | 22 | 272 | |
| **Use of health services in the last 1year** | | | |
| Yes | 25 | 104 | 3.79 (2.0-7.2) |
| No | 19 | 300 | |

### 4.7.2 Co-infection of HIV, HBV, HCV and syphilis among study participants by socio-demographic characteristics

Many study respondents with multiple infections belonged to the age group ranging between 25 and 34 years. Only two participants, one male and one female were co-infected with HIV, HBV, HCV and syphilis. The married group had many study participants with multiple infections **(Table 7)**.

**Table 7.Co-infection of HIV, HBV, HCV and Syphilis among study participants by socio-demographic characteristics**

| Variable | HIV/ HBV/HCV and Syphilis co-infection (%) | HIV / HBV Co-infection (%) | HIV /HCV Co-infection (%) | HIV/ Syphilis Co-infection (%) |
|---|---|---|---|---|
| **Age( years)** | | | | |
| ≥ 24 | 1 (1.1) | 1(1.1) | 1 (1.1) | 2 (2.2) |
| 25-34 | 1 (0.6) | 6 (3.4) | 1 (0.6) | 5 (2.9) |
| 35-44 | | | | 3 (2.7) |
| **Sex** | | | | |
| Males | 1 (0.4) | 3 (1.1) | 1 (0.4) | 5 (1.8) |
| Females | 1 (0.6) | 4 (2.3) | 1 (0.6) | 5 (2.9) |
| **Job category** | | | | |
| Fishermen | 1 (0.6) | 3(1.9) | 1(0.6) | 4(2.5) |
| Fish traders | 1 (0.4) | 2(0.9) | 1(0.4) | 5(2.1) |
| **Marital status** | | | | |
| Single | 1 (0.7) | 1(0.7) | 1(0.7) | 3(2.2) |
| Married | 1 (0.3) | 6(2.0) | 1(0.3) | 7(2.4) |

### 4.7.3 Logistic regression analysis

Multivariate analysis using logistic regression to determine the behavioural risk factors independently associated with HIV infection revealed that regular alcohol intake was associated with HIV infection (AOR=4.4, 95%CI=1.7-11.8). Those who had used the health services in the last one year were more likely to be HIV positive compared to the ones who did not use the services (AOR=3.82, 95%CI=1.9-7.4) (**Table 8).**

**Table 8: Multivariate analysis of risk factors independently associated with HIV infection in the fishing community**

| Risk factors | AOR | 95% CI | p-value |
|---|---|---|---|
| **Frequency of alcohol use** | 4.4 | 1.7-11.8 | 0.003 |
| **No condom use** | 1.85 | 0.85-4.04 | 0.123 |
| **Use of health services in the last year** | 3.8 | 1.9-7.4 | 0.0001 |

None of the behavioural risk factors were found to be associated with the acquisition of HBV, HCV infection and syphilis.

### 4.7.4 Availability and utilization of health services in the fishing community

Most of the study respondents 440 (98.2%) reported that health services for prevention and treatment of STIs are accessible within a distance of five kilometres from the area where the study was conducted. The majority of services are mainly provided through government facilities. One hundred and twenty nine (29.3%) of the study respondents had utilized the services in the past one year. Fewer females utilized the services compared to male study participants **(Table 9).**

**Table 9: Availability and utilization of health services in the fishing community at Mwaloni (N=448)**

| **Type of health facility** | | **No.** | **%** |
|---|---|---|---|
| Government | | 420 | 95.2 |
| Private | | 17 | 3.9 |
| Church based | | 4 | 0.9 |
| **Average distance to the Health facility** | | | |
| Less than 5 kilometres | | 441 | 98.4 |
| **Availability of facilities which provide HIV and other STIs related services (n=448)** | | | |
| Yes | | 440 | 98.2 |
| No | | 2 | 0.4 |
| Don't know | | 6 | 1.3 |
| **Utilization of services in the last 12months (n=440)** | | | |
| | Yes | 129 | 29.3 |
| | No | 311 | 70.5 |
| Males (Yes) | | 70 | 54.3 |
| Females (Yes) | | 59 | 45.7 |

## 5.0 DISCUSSION

This study aimed at determining the seroprevalence of HIV, HBV, HCV and syphilis and the associated risk factors in fishing communities in Mwanza region. Mobilization was done through the Beach Management Unit (BMU) to enhance the response rate. The Beach Management Unit facilitated identification of the sampled study participants and enrolment into the study. Previous studies in Tanzania have focused on national and regional sero-prevalence of STIs however this study concentrated on the fishing community in Mwanza region at Mwaloni landing site.

Results from this study revealed higher prevalence of HIV, HCV and syphilis compared to the prevalence figures for the general population in the country. Eighty (17.9%) study participants with STIs belonged to the age group ranging between 25 and 34 years. The married group had more study participants with STIs compared to those who were single, divorced or cohabiting. This may be due to the possibility of multiple sexual partners. The information on multiple sexual partners gathered using questionnaires may have not been true since this is likely to be kept as a secret by most individuals.

This study determined the seroprevalence of HIV, HBV, HCV and syphilis to be 9.8%, 9.2%, 5.6% and 14.3% respectively. The prevalence of HIV obtained from the fishing community (9.8%) is about two times more than the national HIV prevalence for the general population which is about 5.1% **(19)**. The seroprevalence of HCV was (5.6%) which was also about two times more than the national HCV prevalence (3.2%) **(50)** .The prevalence of HBV in this study was found to be 9.2%, this prevalence was almost the same as the prevalence of the nation for the general population (9.9%) **(42)**.The prevalence of syphilis (14.3%) was about five times more than the national prevalence of syphilis (2.7%) **(55)** .The findings show that fishing communities have the greatest risk of acquiring STIs compared to the general population. A cross sectional study done in Uganda in fishing communities documented HIV prevalence of 28.8% which was higher than the prevalence of the nation for the general population 5.4%**(21)** and that of syphilis to be 4.3%**(21)** compared to the national prevalence of 2% **(56)**. Similar studies done in Cambodia, Kenya and other parts of the world reported a high prevalence of STI in fishing communities. The fishing communities are regarded as the mobile population and they spend a long time away from their home which may cause them to be engaged in risky sexual behaviour. Fishing communities have an access to daily cash income which increases their vulnerability to STIs.

Several risky sexual behaviours were associated with STIs acquisition in this study. Fishing community specific drivers and vulnerabilities for acquiring STIs that were evident from this study include regular alcohol consumption and inconsistent condom use which were frequently reported by the study respondents. Study participants who were taking alcohol regularly were found to have the greatest risk of acquiring STIs compared to those who took alcohol occasionally.

In this study, thirteen (2.9%) study participants with multiple infections had the age ranging between 25 and 34 years, most of them being married. Six (3.4%) were co-infected with HIV and HBV, 5(2.9%) co-infected with HIV and syphilis while one study participant was co-infected with HIV, HBV, HCV and syphilis. There was no difference in HIV/HBV and HCV/syphilis co-infection among males and females. Co-infection with HBV and HCV is characterized by a more rapid progression towards end stage liver disease leading to increased morbidity and mortality [(57)].

About 129(29.3%) of the study participants reported to have utilized the health services in the last twelve months and the services were accessible within a distance of five kilometres which is the acceptable distance according to the health policy of the country (Tanzania). More male study participants had utilized health services in the last twelve months compared to females. This could have occurred by chance since 61.2% of the study respondents were males. In fishing communities males are predominant. Low utilization of health services can be due to the education status of study participants since 81(18.1%) had no formal education while 316 (70.5%) had primary education. The nature of work of fishermen also may affect health seeking behaviours of these individuals because they spend most of their time in water. Those who had used the health services in the last one year were more likely to test HIV positive compared to the ones who did not. It is possible that they decided to seek for these services because of HIV related complications. The role of traditional healers in health service provision in the fishing community was not assessed in this study.

Fish processors, boat builders/repairers and net repairers were not captured in this study. The nature of their work forces these people to move around all sites of the Lake for service delivery while fish processors move from one area to another depending on fish availability. Fish processors are members of the fishing community who are involved in fish preservation

using either smoke or salt. The prevalence of sexually transmitted infections may be higher in those groups which were missed because of their high mobility.

The findings from this study revealed that the prevalence of HIV, HCV and syphilis in the fishing community in Mwanza region were higher compared to the prevalence figures for the general population in Tanzania. Study participants with the age ranging between 25 and 34 years had more individuals with multiple infections.

The acquisition of HIV was associated with the frequency of alcohol consumption among the study respondents. Regular cash income pushes fishing communities to drinking alcohol. They also take alcohol as a way of trying to cope with the dangers related to their work.

## 5.1 CONCLUSIONS

The prevalence of HIV, HBV, HCV infection and syphilis were higher compared to the national prevalence figures. Frequent alcohol consumption was found to be a risk factor for acquiring HIV in the fishing community. The utilization of health services by the study respondents was low despite reporting the services to be within a distance of five kilometres.

## 5.2 RECOMMENDATIONS

The high seroprevalence rates of STIs obtained from the fishing community require efforts for addressing specific risk factors in fishing communities to reduce the transmission of STIs. Reduction of alcohol consumption in the fishing communities should be emphasized through health education, mobile health services usually concentrate on disease screening forgetting health education because of time pressure. Regular mobile health services for prevention and treatment of STIs in fishing communities can help on awareness creation about STIs and minimize transmission.

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## 7.0 APPENDICES

### *7.1 APPENDIX 1: Consent form (English version)*

Muhimbili University of Health and Allied sciences

ID-N0 |  |

Consent to participate in study: Sero-prevalence of HIV, HBV, HCV and Syphilis among the fishing communities at Mwaloni landing site along the shores of Lake Victoria in Mwanza region.

My name is Simon Ezekiel Kabamanya. I am pursuing the Masters of Science in Epidemiology and Laboratory Management at MUHAS. I am doing a research on the SEROPREVALENCE OF HIV, HBV, HCV AND SYPHILIS AMONG THE FISHING COMMUNITIES AT MWALONI LANDING SITE ALONG THE SHORES OF LAKE VICTORIA IN MWANZA REGION which is part of my study at the university.

The purpose of this study is to determine the seroprevalence of HIV, HBV, HCV and Syphilis infection and the associated risk factors among the fishing communities. If you agree to join this study, you will be required to answer a series of questions that have been prepared for the study through interview in order to obtain the intended information. As part of this study, we are requesting people to give a small amount of blood (about 4ml) to test for the above mentioned conditions. This information will help the Mwanza Municipal council and Ministry of Health to plan programs to take care of these diseases.

**Procedure**

If you agree to take part, you will be asked to provide about 4ml of venous blood. Your blood specimen will be tested for HIV by the counsellors at the site; the remaining portion will be transported to Bugando referral Hospital for HBV, HCV and Syphilis Screening.

**Confidentiality**

I will put a study number, but not your name on the blood sample. A high level of privacy will be maintained and no one will know your results.

**Risks of taking part in the study**

The risk to you if you take part in testing is minimal. All instruments that will be used to collect blood are clean and safe. They have not been used before and will be safely destroyed after a single use. You may experience pain when blood is being drawn. If you have any pain, bleeding, or swelling from taking blood, please contact our study staff or your health worker.

**Benefits from the study**

Trained counsellors will be available at the site for the same day Voluntary Counselling and testing. If you wish to know your HIV status, information can be obtained from the counsellors.

You will also get information on how to prevent HIV and sexually transmitted infections.

Once results on HBV, HCV and Syphilis screening are available you can freely get the information regarding those tests. If you will be found to have HIV or any of the above mentioned conditions, you will be referred to Mwanza Regional Hospital for follow-up.

The information from your tests will be used to make health programs stronger in the region.

Do you want to ask me anything about this study? If you have any questions, please be free to ask.

All collected information will be kept strictly confidential and will only be used for study purposes. Identification numbers will be used instead of names.

To participate in this study is completely voluntary. You can freely choose not to participate in this study, and even if you have been enrolled in the study you can quit at any time if you feel to do so. No penalty or loss of any benefits upon refusal to participate or withdrawal from the study. Participating individuals will be linked to Mwanza regional hospital for the appropriate health services however found to have a problem.

We do not anticipate that any harm will occur to you .However there will be no compensations to you in case it occurs.

If you have questions about this study, you should contact the Principal Investigator MR. SIMON EZEKIEL KABAMANYA, MUHAS, P.O. Box 65001 Dar es salaam - Tanzania .Mobile 0784823080/0755914654/0654914654. If you have questions which need further clarification, as a participant you have a right to contact the **Chairman of MUHAS Research and Publication Committee, Professor M. Moshi**. P.O. Box 65001, Dar es salaam, Tanzania. Tel: +255 2150302-6.

I have read and understood the purpose of the study and your request for me to participate in this study and my questions have been sufficiently answered.

Participant agreed ☐ Participant did not agree ☐

Signature of Participant/Thumb print _____

Signature of the interviewer_____

Date consent signed _____

**7.2 APPENDIX 2: Swahili version**

HATI YA KUKUBALI KUHOJIWA NA KUTOLEWA DAMU

Namba ya utambulisho

Habari, Jina langu naitwa Simon Ezekiel Kabamanya. Ninasoma katika chuo Kikuu Cha **MUHIMBILI,** ikiwa kama sehemu ya kukamilisha masomo yangu ya shahada ya Uzamili ya epidemiologia**,** ninafanya utafiti juu ya **kiasi cha maambukizi ya VVU,HOMA YA INI PAMOJA NA KASWENDE kwa watu wanaohusika na biashara ya samaki hapa Mwaloni.**

Matokeo ya utafiti huu yataisaidia serikali na halimashauri ya jiji la Mwanza katika kupanga mikakati ya kuboresha huduma za kuzuia na kupambana na magonjwa yaenezwayo kwa njia ya kujamiiana katika jamii za wavuvi. Wale ambao vipimo vitaonyesha kuwa wana matatizo watatumwa sekouture hospitali kwa matibabu au msaada wa kitaalamu.

Mazungumzo yetu yatachukuwa kama dakika kumi na tano mpaka ishirini hivi kukamilika, zitatumika namba na sio jina wala hakutakuwa na kitu kingine chochote cha kutambua ushiriki wako. Taarifa utakazozitoa zitakuwa ni siri na zitatumika kwa ajili ya utafiti tu na si kwa kitu kingine chochote.

Kama sehemu ya utafiti huu, utaombwa kutoa kiasi kidogo cha damu kwa ajili ya kupima maambukizi ya VVU, homa ya ini na kaswende. Damu itachukuliwa na mtalaamu wa maabara na vifaa vitavyotumika viko salama, havijatumika kwa mtu mwingine na baada ya kutumika viatatupwa kwa kufuata taratibu. Tutatumia namba na siyo majina, hivyo hakuna mtu ataweza kujua majibu yako. Utasikia maumivu kidogo wakati wa kuchukua damu.

Hatutarajii kutokea madhara ya aina yoyote kwako yatakayosababishwa na utafiti huu, hata hivyo kama yatakuwepo, hakutakuwa na fidia ya namna yoyote

Kushiriki kwako katika utafiti huu ni hiari, unaweza kuamua kukataa au kutoshiriki katika utafiti huu na hakuna adhabu itakayofanyika kwa kutoendelea kushiriki katika mazungumzo. Hata hivyo ni mategemeo yangu kuwa utashiriki kikamilifu katika utafiti huu kwani maoni yako ni muhimu sana.

Kama utakuwa na maswali zaidi juu ya utafiti huu wasiliana na mtafiti mkuu SIMON E.KABAMANYA, CHUO CHA MUHIMBILI, S.L.P 65001, Dar es Salaam, TANZANIA. Mobile 0784823080. Una haki pia ya kuwasiliana na **Mwenyekiti wa kamati ya utafiti na machapisho ya Chuo kikuu cha Muhimbili, Professor M.Moshi 65001, Dar es Salaam, TANZANIA. Tel: +255 2150302-6**

"*Nimesoma na nimeelewa ombi lako, kwa hiari yangu, bila ya nguvu wala ahadi zozote nakubali kushiriki katika utafiti huu*".

"Samahani, sipo tayari kushiriki ☐ Nipo tayari Kushiriki ☐

Sahihi ya mshiriki/Alama ya dole gumba……..... Tarehe.....

Sahihi ya muulizaji..... Tarehe .....

### 7.3 APPENDIX 3: QUESTIONNAIRE: English version

| | | |
|---|---|---|
| **SEROPREVALENCE OF HIV,HBV,HCV AND SYPHILIS AND ASSOCIATED RISK FACTORS IN THE FISHING COMMUNITY IN MWANZA REGION-2012** | | |
| **IDENTIFICATION** | | |
| QUESTIONNAIRE NUMBER_____ Date...../...../2012<br>1. How old are you (age in complete years)_____<br>2. For how long have you been working in this fishing community? _____<br>3. What is your job category in this fishing community_____ | | |
| 4 | What is your current marital status? | Married.....1<br>Single.....2<br>Cohabiting.....3<br>Divorced.....4<br>Widowed.....5 |
| 5 | If married, to how many wives/husbands? | One.....1<br>Two.....2<br>More than two.....3 |
| 6 | What is the highest level of school you attended? | No formal education.....1<br>Primary.....2<br>Secondary.....3<br>University/College.....4 |
| 7 | Do you take alcohol, bhang or cocaine? | Yes.....1<br>No.....2 |
| 8 | If, Yes how often? | Daily.....1 |

| | | |
|---|---|---|
| | | Occasionally.....2 |
| 9 | Have you had sex with someone who is not your wife/husband while drunk? | Yes.....1<br>No.....2<br>Do not remember.....3 |
| 10 | If Yes, did you use a condom? | Yes.....1<br>No.....2<br>Do not remember.....3 |
| 11 | If you are not drunk, do you use a condom? | Yes.....1<br>No.....2 |
| 12. | Are there facilities that provide HIV services and other sexually transmitted infections in this area? | Yes.....1<br>No.....2<br>Do not know.....3 |
| 13 | Who provide these services? | Health facility(government).....1<br>Health facility (private).....2<br>Mobile clinics.....3<br>Health facility(Church based).....4 |
| 14 | What is the approximate distance to the nearest health facility? | Less than 5 kilometres.....1<br>More than 5 kilometres.....2<br>Do not know.....3 |
| 15 | Have you used these services in the last 12 months? | Yes.....1<br>No.....2<br>Do not remember.....3 |

### 7.4 APPENDIX 4 QUETIONNAIRE: Swahili version

| | | |
|---|---|---|
| **SEROPREVALENCE OF HIV,HBV,HCV AND SYPHILIS AND ASSOCIATED FACTORS IN THE FISHING COMMUNITY IN MWANZA REGION-2012** | | |
| UTAMBULISHO | | |
| NAMBA YA DODOSO..... Tarehe...../...../2012<br>1. Una miaka mingapi? (Umri)_____<br>2. Ulianza kufanya kazi na jamii ya wavuvi tangu lini?_____<br>3. Unafanya shughuli gani kwenye jamii ya wavuvi?_____ | | |
| 4 | Mahusiano | Nimeoa/Nimeolewa.....1<br>Sijaolewa/oa.....2<br>Nina nyumba ndogo.....3<br>Nimeachika.....4<br>Ni mjane.....5 |
| 5 | Kama umeoa una wanawake wangapi? | Mmoja.....1<br>Wawili.....2<br>Zaidi ya wawili.....3 |
| 6 | Ulisoma mpaka darasa la ngapi? | Sikusoma.....1<br>Shule ya msingi.....2<br>Sekondari.....3<br>Chuo.....4 |
| 7 | Unakunywa pombe au madawa ya kulevya? | Ndiyo.....1<br>Hapana.....2 |
| 8 | Kama ndiyo,ni kwa kiasi gani? | Kila siku.....1<br>Mara chache.....2 |

| | | |
|---|---|---|
| 9 | Uliwahi kujamiiana na mtu ambaye si mke wako/mume wako ukiwa umelewa? | Ndiyo.....1<br>Hapana.....2<br>Sikumbuki.....3 |
| 10 | Kama ndiyo ulitumia condomu? | Ndiyo.....1<br>Hapana.....2<br>Sikumbuki.....3 |
| 11 | Kama hujalewa huwa unatumia condomu? | Ndiyo.....1<br>Hapana.....2 |
| 12. | Kuna vyombo vinavyotoa huduma za VVU na magonjwa mengine ya zinaa katika eneo hili? | Ndiyo.....1<br>Hapana.....2<br>Sijui.....3 |
| 13 | Ni nani hutoa huduma hizi? | Kituo cha afya (serikali).....1<br>Kituo cha afya (Binafsi).....2<br>Wataalam kutoka sehemu nyinginezo.....3<br>Kituo cha afya (Mashirika ya dini).....4 |
| 14 | Ni umbali gani kwa wastani kutoka hapa mpaka kwenye kituo cha afya kilichopo karibu zaidi? | Chini ya kilometa tano.....1<br>Zaidi ya kilometa tano.....2<br>Sijui.....3 |
| 15 | Umetumia huduma hizi ndani ya miezi 12 ( miezi kumi na mbili iliyopita)? | Ndiyo.....1<br>Hapana.....2<br>Sikumbuki.....3 |

**7.5 APPENDIX 5: CASE REPORT FORM**

| SPECIMEN ID NO. | AGE | SEX | JOB CATEGORY | HIV | H BV | HCV | SYPHIL. |
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