PROPORTION AND FACTORS ASSOCIATED WITH DELAY IN THE COMMENCEMENT OF TB TREATMENT IN SELECTED HOSPITALS IN KWALE COUNTY, KENYA

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Proportion and Factors Associated with Delay in the Commencement of TB Treatment in Selected Hospitals in Kwale County, Kenya

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DECLARATION

This thesis is my original work and has not been submitted for a degree in any other university.

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This thesis has been submitted for examination with our approval as University Supervisors

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LIST OF ABBREVIATIONS

AFB:	Acid Fast Bacilli
AIDS:	Acquired Immune Deficiency Syndrome
BCG:	Bacille Calmette-Guerin
CDC:	Centre for Disease Control and Prevention
CNR:	Case Notification Rate
DOTS:	Directly Observed Therapy Short Course
DTLC:	District TB and Leprosy Coordinator
EPTB:	Extra Pulmonary Tuberculosis
HIV:	Human Immune Deficiency Virus
HSB:	Health Seeking Behavior
MDRTB:	Multi- Drug Resistance TB
MoH:	Ministry of Health
NLTP:	National Leprosy and TB Programme
OR:	Odds Ratio
PLWHA:	People Living With HIV/AIDS
PTB:	Pulmonary Tuberculosis
TB:	Tuberculosis
TST:	Tuberculin Skin Test
WHO:	Word Health Organization

DEFINITION OF OPERATIONAL TERMS

Diagnostic delay	is the interval between onset of symptoms and confirming the tuberculosis diagnosis (labelling of the patient as a TB patient)
Health care system delay	is the time taken from the first date of health-seeking behavior to a health facility to the initiation of anti-tuberculosis treatment.
Patient delay	is the time interval from the onset of symptom to the first presentation to a health care provider.
Positive TB:	Laboratory confirmed Mycobacterium tuberculosis
Service timeliness:	Time interval between the date of patient presenting to a health care provider and the initiation of anti-TB treatment.
Total delay in TB treatment	The time interval from the onset of illness until initiation of anti-TB treatment. It is the sum of two intervals: diagnostic and treatment delay
Treatment delay	Period between diagnosis of TB and initiation of anti-tuberculosis drugs

ABSTRACT

Tuberculosis is an infectious bacterial disease caused by Mycobacterium tuberculosis which commonly affects the lungs but can affect other parts of the body. With a burden of disease that accounts for over 10 million cases annually (of which less than two thirds are reported), TB is the leading cause of death from a single infectious agent across the world, ranking above HIV/AIDS. In Kenya, Tuberculosis (TB) remains one of the greatest health threats as it is one of the leading causes of death in the economically active age groups and in people living with HIV. Although the most essential component of tuberculosis control is the early detection and treatment of infectious cases, longer intervals from TB symptom onset to TB diagnosis and treatment continue to adversely affect public health and clinical outcomes. Delays in diagnosis and initiation of effective treatment increase morbidity and mortality from tuberculosis as well as the risk of transmission in the community. This study aimed at investigating the factors associated with delay in commencement of TB treatment in selected health facilities in Kwale County, Kenya. Factors assessed included: social demographic factors, proportions of delayed TB treatment, social cultural and health related system factors that constrain early TB diagnosis and treatment among TB patients in Kwale County. The study adopted descriptive cross-sectional study design. Purposive sampling was used to identify the health facilities and interviewer-assisted structured questionnaires were used for primary data collection. Quantitative data was analyzed using SPSS version 20, descriptive analysis was conducted to determine proportions and probit binary regression analysis was done to identify independent variables influencing dependent variables. Qualitative data was organized using framework and thematic methods using NVivo version 12. All the analyses were done at 95% confidence interval. The results of the study showed that 69.4% of TB patients delayed starting TB drugs. Binary regression analysis showed that social demographic characteristics: gender (OR 8.026, 95% CI of OR: 3.659-17.608, $P<0.05$), (level of education (OR 2.381, 95% CI of OR: 1.413-4.011, $P<0.05$) and employment status (OR 6.146, 95% CI of OR: 2.086-18.080, $P<0.05$) significantly influenced TB treatment delay. Inadequacy of TB diagnostic machines, weak surveillance systems and poor roads were factors in health system found to barriers to timely diagnosis and commencement of TB treatment. In the social cultural context, seven thematic areas (stigma, believing in witchcraft, positive TB diagnosis dispute by TB patients, seeking alternative tradition treatment, and buying drugs over the counter, TB inheritance, religious issues) were reported to constrain the commencement of TB treatment. The study concluded that some there is a high proportion of delay in TB treatment among newly diagnosed TB patients attending Kwale sub-County hospital and Msambweni County Referral Hospitals. Sociodemographic factors that influenced this delay were the level of education, gender and employment status. Health care service-related factors such as inadequacy of diagnostic machines and poor road network as well as sociocultural factors such as belief in witchcraft, and buying drugs over the counter were important barriers to timely TB diagnosis and treatment among newly diagnosed TB patients attending Kwale sub-County and Msambweni County Referral hospitals.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Tuberculosis remains a major threat to health in the world; the burden is accelerating due to poverty, increased population and HIV/AIDS (Asres *et al*., 2018). Tuberculosis (TB) which is caused by *Mycobacterium tuberculosis*, is an infectious disease with huge implications on public health globally (Seid & Metaferia, 2018). With a burden of disease that accounts for over 10 million cases annually (of which less than two thirds are reported), TB is the leading cause of death from a single infectious agent across the world, ranking above HIV/AIDS (Ayalew *et al*., 2020; World Health Organization, 2019). In Africa TB prevalence still remains high with about 100 to 700 people per 100,000 suffering from TB. Furthermore about 30-50% of newly diagnosed TB cases in Africa are also infected with HIV. Additionally at least 40% of all AIDS death in the region are due to TB (WHO, 2021). Kenya is listed by the WHO among the 30 high burden TB countries, with the disease still the 5th leading cause of death (Enos *et al*., 2018; Ministry of Health, 2019). According to the Kenya TB Prevalence Survey of 2016, the prevalence of TB in Kenya was 558 cases per 100,000 adult population while the mortality from all forms of TB was 20 per 100, 0000 population (Ministry of Health, 2016). Nairobi, Coast and Nyanza were the three regions with the highest reported TB cases.

TB occurs in two clinical forms based on the anatomical cite of the disease: Pulmonary (further classified as smear positive and smear negative PTB) and Extra Pulmonary TB (EPTB) (Ministry of Health, 2013). TB is also classified based on drug resistance (Monoresistance, extensive drug resistance, multi-drug resistance), HIV status (HIV-positive, HIV-negative and HIV status unknown TB patients) and history of previous TB treatment (relapse patients, treatment after failure patients, treatment after loss to follow up patients) (WHO, 2020a). Mild TB is categorized as PTB since there are lung lesions (MoH, 2013). The most common diagnostic procedure for pulmonary TB in low-income areas is still sputum smear microscopy for the identification of acid-fast bacilli (AFB). The gold standard for TB laboratory

confirmation is sputum culture, yet in many nations, these factors are unavailable. Recently, the Cepheid Xpert MTB/RIF assay, an automated polymerase chain reaction platform, was created for the quick diagnosis of TB (Cavanaugh et al., 2016).

Tuberculosis can affect anyone but there are specific populations groups at higher risk of getting infected with TB and the infection progressing to disease; the groups include people living with HIV infection, health workers and other people in settings with a high-risk transmission by *Mycobacterium tuberculosis*. For example, global TB data shows that out of the estimated 920,000 incident TB cases among people living with HIV in 2017, approximately 300,000 of this population died from TB (WHO, 2019). Although the most essential component of tuberculosis control is the early detection and treatment of infectious cases, longer intervals from TB symptom onset to TB diagnosis and treatment continue to adversely affect public health and clinical outcomes (Roberts *et al*., 2020).

The consequences of prolonged TB diagnosis and treatment include; increased risk of spreading infection, out of pocket spending by patients and limited success of TB treatment accompanied alongside high risk of morbidity and mortality (Tegegn & Meseret, 2009). Therefore, the importance of ensuring effective methods of early detection and prompt treatment of these cases cannot be overlooked (Mfinanga *et al*., 2008). Unfortunately, in low-income countries such as Kenya, late diagnosis and treatment of TB cases continue to be the principal obstacle to TB control.

One of the longest total delay in TB diagnosis and treatment (356 days) was noted in Afghanistan (Getnet *et al.*, 2017). According to a study in Tanzania, approximately 80% of the patients in the study reported to health facilities longer than 30 days after onset of symptoms, presenting a mean delay of 162 days (Wandwalo & Mørkve, 2000). Similarly, studies done among pulmonary tuberculosis (PTB) patients in Ethiopia showed that the median patients' delay was ranged from 20 to 30 days while the health system's delay ranged between 33.5 and 42 days (Seid & Metaferia, 2018). In Kenya, though there are regional variations in total delay in TB diagnosis and treatment, it generally ranged from 40–97 days according to the Ministry of

Health, (2016). Despite the goal to reduced incidence of TB as targeted in the Millennium Development Goals, 50% of the suspected cases are not identified and continue to be source of TB infection (MoH, 2016).

Delay in management of TB is a composite of various factors, some of which are linked to the patient and others to the health system (Mfinanga *et al*., 2008). Patients' health care seeking behavior and health system provision of prompt diagnosis and treatment influences diagnosis of TB cases (Muttamba *et al*., 2019). Several causes of delays in diagnosis and treatment of TB have been reported, including poor perceptions of health services, severe underlying illness, distance from health facilities, and socio-economic factors among others (Mfinanga *et al*., 2008). Studies carried out at different settings have indicated factors such as education, unemployment, lack of knowledge about TB symptoms and patients with good functional status and patients in contact with more than two health providers as determinants of TB treatment delay (Ayalew *et al*., 2020). A study in Zambia showed that visiting a private doctor or traditional healer, education, and sex had a significant influence on the diagnostic and treatment delay (Needham *et al*., 2001).

Despite reducing incidence of tuberculosis as targeted in the Millenium Development Goals, still fifty percent of the suspected TB cases in Kenya are not identified and continue to be a source of infection (MoH, 2016). To increase the incidence of diagnosis, it is essential to pinpoint the causes of the delay in starting a TB treatment regimen. In light of the foregoing, the purpose of this study was to ascertain the prevalence of and contributing reasons to delays at the start of TB treatment in particular health facilities in Kwale County, Kenya.

1.2 Statement of the problem

Globally, tuberculosis (TB) continues to be a huge threat to public health and is the leading cause of death from a single infectious agent. In 2017, 1.6 million deaths due to TB were recorded and 10 million people (of which less than two thirds are reported), are estimated to develop the disease annually (Enos et al., 2018; World Health Organization, 2019). In Kenya, the burden of TB is high (proportion of 558

per 100,000 people) (Ministry of Health, 2019), with the disease ranking 5th leading cause of death (MoH, 2019).

One of the main challenges leading to the great burden of TB in Africa is delays in TB diagnosis and treatment (Asefa & Teshome, 2014). Like many other developing countries in Africa, Kenya's TB control program relies heavily on passive case finding this involves relying on patients to voluntarily seek treatment (Mbuthia *et al*., 2018). Delays in seeking treatment increase the spread of TB, and it is thought that one untreated smear-positive patient will typically infect 10 contacts per year and 20 more people before dying from the disease (Asefa & Teshome, 2014). Delays in TB diagnosis and treatment may also cause the disease to manifest in a more advanced state, increasing the risk of late sequelae and overall death (Asefa & Teshome, 2014).

With the high burden of TB in Kenya, it is estimated that more than 169,000 persons fall ill with TB annually, yet only about 80, 000 cases are notified every year. This means that approximately 40% of estimated TB cases in Kenya are not diagnosed, treated and/or notified annually (National Tuberculosis Leprosy and Lung Disease Program, 2017). According to the NTLD-P, (2017) of Kenya, Kwale County on average contributes to about 8% of the total PTB Positive cases in Kenya and incidentally has a higher proportion of PTB+ to total TB case ratio compared to national figures. Also, case detection rate in the county has remained consistently lower (<175/100,000) than the national averages for more than a decade (National Tuberculosis Leprosy and Lung Disease Program, 2017).

Access to health care, patient delay and associated factors, health facility factors including waiting time, referral delays, diagnostics delays, health practitioners' ability to suspect TB at first visits and diagnosed TB early are thought to affect the timeliness of TB treatment initiation among PTB patients visiting health facilities. In addition to these factors, the TB problem is more challenging due to co-infection with HIV/AIDS. While the TB- HIV/AIDS co-infection globally represents only 11 percent of the total TB burden, in some countries of Sub-Saharan Africa, as many as three quarters of TB patients are co-infected with HIV/AIDS (Bloom et al., 2017). In Kenya, among people living with HIV, TB is the single leading cause of death. With

more than 35% of persons with TB infected with HIV, the TB and HIV co-infection forms an enormous burden on Kenya's health system, among patients and their families (Centers for Disease Control and Prevention, 2015).

Timely case detection and prompt treatment initiation are key as PTB+ cases remain the main source of active infection in our communities. There are no published studies on Kwale County, Kenya in regard to delay in commencement of TB treatment and factors affecting these delays. Therefore, knowledge on the factors associated with delay in commencing TB treatment regimen may inform the implementation of measures for timely diagnosis and treatment initiation so as to reduce transmission of TB in health facilities and communities in the Region.

1.3 Justification of the study

There is little data available regarding the circumstance among TB patients in Kwale County, despite the fact that numerous studies have been undertaken on the variables contributing to delays in TB diagnosis and seeking treatment. Delays in TB diagnosis and treatment have been linked to worsening of the condition, higher fatality rates, and increased community transmission. According to estimates, a single diseased person who goes unnoticed and thus untreated can infect ten to fifteen people annually, creating a vicious circle of ineffective control measures.

The results of this study will provide information on the social-cultural, health system, and demographic aspects that contribute to the delay in starting TB treatment, which will help partners in the health sector establish policies and strategies to lessen that delay. Additionally, by encouraging early treatment beginning among TB patients, such initiatives are essential to enhancing and boosting TB treatment success (cure and treatment completion) in Kwale County. Furthermore, the TB patients will benefit through timely treatment and reduced burden associated with TB. The health workers will benefit from a low risk of TB related infections and reduced work load. Additionally, the TB treatment.

Results findings will also contribute to the exiting body of knowledge providing new context and specific information on TB management in Kwale County, Kenya. The

strategies developed in Kwale County can further be up scaled to national and regional level.

1.4 General Objective

To determine the proportion of patients and factors associated with delay in the commencement of TB treatment in Kwale County, Kenya.

1.4.1 Specific Objectives

1. To establish the proportion of patients with delayed TB treatment in Kwale County Kenya
2. To determine the social-demographic factors associated with delay in commencement of TB treatment in Kwale County, Kenya.
3. To determine health systems factors associated with delay in the commencement of TB treatment in Kwale County, Kenya.
4. To establish social cultural factors associated with delay in commencement of TB treatment in Kwale County, Kenya

1.5 Research Questions

1. What is the proportion of patients with delayed TB treatment in Kwale County Kenya?
2. What are the social-demographic factors associated with delay in commencement of TB treatment in Kwale County, Kenya?
3. What are the health systems factors associated with delay in the commencement of TB treatment in Kwale County, Kenya?
4. What are the social cultural factors linked to delay in commencement of TB treatment in Kwale County, Kenya?

1.7 Conceptual Framework

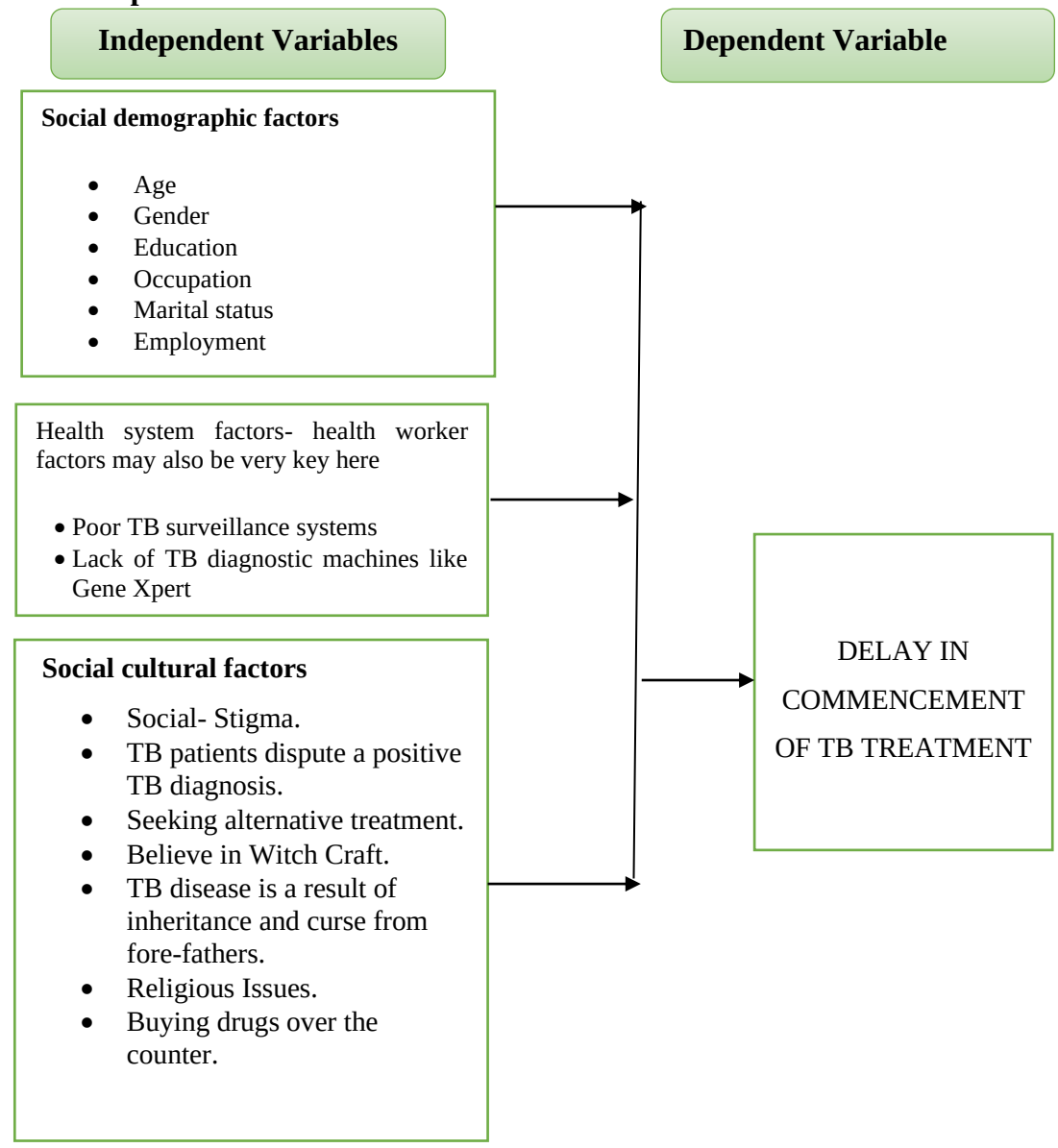

Figure 1.1: A diagram of independent and dependent variables in the commencement of TB treatment.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of TB: Infection and control, classifications diagnosis and treatment

Mycobacterium tuberculosis (MTB), an infectious illness that spreads between people via the respiratory pathway, is the cause of tuberculosis (Bloom et al., 2017). Although it can harm any tissue, the lungs are primarily affected. One difficulty with TB is that the bacteria can remain dormant in many infected people for years before becoming active again and causing disease (Bloom et al., 2017). The chance of developing TB disease increases significantly for those who also co-infect with HIV/AIDS or other autoimmune-compromising disorders, and it is highest immediately after the initial infection. Although bacille Calmette -Guerin (BCG) vaccine is still the world's most extensively used vaccine, its effectiveness appears to be incomplete and varies considerably across geographic regions (Bloom *et al*., 2017).

There are numerous criteria used to classify TB cases. According to the anatomical site of the disease, TB is divided into two categories: pulmonary (also known as smear positive and smear negative PTB) and extra pulmonary (EPTB) (Ministry of Health, 2013). Any case of TB with bacteriological confirmation that affects the lung parenchyma or the tracheobronchial tree is referred to as pulmonary TB. A type of TB known as extra pulmonary involves organs other than the lungs (Ministry of Health, 2013). In terms of HIV status, TB is classified into HIV-positive patient, HIV-negative TB patient and HIV status unknown patient. TB is also classified with regards to drug resistance whereby monoresistance refers to resistance to one first-line anti TB drug only, polydrug resistance entails resistance to more than one first-line anti-TB drug (besides isoniazid and rifampicin), multidrug resistance involves resistance to at least both isoniazid and rifampicin, extensive drug resistance involving resistance to any fluoroquinolone and to at least one of three second-line injectable drugs in addition to multidrug resistance. Rifampicin resistance refers to resistance to rifampicin detected using phenotypic or genotypic methods, with or

without resistance to other anti-TB drugs. On the basis of history of previous TB treatment, TB cases are classified as new patients, previously treated patients, treatment after failure patients, relapse patients, treatment after loss to follow up patients and other previously treated patients (WHO, 2020a).

TB treatment regimen comprise of multiple drugs for many months. Treatment with a single drug can lead to the development of a bacterial population resistant to that drug (CDC, 2013). However, the long-term therapy is usually challenging for both the patients and healthcare systems especially in low-resource settings where the burden of disease often exceeds the available resources (Bloom *et al*., 2017; Connolly *et al*., 2007). Ensuring that patients adhere to treatment can be hard because patients are often unable or reluctant to take multiple medications for several months. Nonadherence to treatment is a huge problem in TB control and can lead to treatment failure, continued transmission, Relapse and development of drug resistance (CDC, 2013). In some regions, the incidence of drug-resistant TB, necessitating even longer treatment regimens with more expensive and difficult to tolerate -drugs is on the rise (Bloom *et al*., 2017).

In terms of diagnosis, low- and middle-income countries mainly rely on microscopic examination of stained smears of sputum of suspected patients. Smear microscopy, however, is able to detect only 50-50% of all cases (smear positive) (Bloom *et al*., 2017). Recently, more sensitive methods of diagnosing TB and detecting drug resistance have become available although they are more expensive (Bloom *et al*., 2017; Cavanaugh *et al*., 2016).

2.2 Proportion of patients diagnosed with TB that delay commencement of treatment

TB has been acknowledged as a public health problem globally since an estimated 7-8 million cases and 1.3-1.6 million mortality cases were reported in 1993 (Asres *et al*., 2019). Despite numerous global strategies to control TB, the disease remains among the major global public health problems. In 2017, approximately 10 million incident cases and 1.3 million deaths were reported to occur across the world (Asres *et al*., 2019). Kenya is classified among the top 30 countries globally with the

highest proportions of TB (World Health Organization, 2020b). In Kenya, case detection is largely passive and the patient plays a huge part in reducing diagnosis and treatment delay. Therefore, seeking treatment for TB continues to be a high challenge in TB control in Kenya (Nyatichi & Amimo, 2016). Approximately 50% of TB cases remain undiagnosed in Kenya according to the Ministry of Health leading to increased rates of transmission, morbidity and mortality (Nyatichi & Amimo, 2016).

Control of TB in the community is dependent on early diagnosis and initiation of treatment (Seid & Metaferia, 2018). Delay in TB diagnosis and treatment comprises the main obstacles in Control programs especially in low-income countries like Kenya (Awoke *et al*., 2019). Longer intervals between the onset of TB symptoms and commencing anti-TB treatment contribute largely to increased risk of transmission to contacts, adverse clinical outcomes for TB patients, out of pocket expenditures of patients in the community and high risk of morbidity and mortality among others (Roberts *et al*., 2020; Seid & Metaferia, 2018). Globally, various factors influencing commencement of TB treatment have been investigated and broadly categorized patient and health care provider related factors or a combination of the two (Seid & Metaferia, 2018). Patient demographics, socioeconomic level, accessibility to healthcare facilities, the skill of healthcare personnel, and the availability of equipment are a few factors that have been linked to delays in TB diagnosis and treatment (Noora et al., 2020).

2.3 Social demographic factors associated with delay in commencement of TB treatment drugs.

According to the study by Seid and Metaferia (2018) Old age was associated with patient delay probably because older people are more likely to do self-medication and visit private clinics. Negin *et al.*, (2015) in their study found out that treatment success rate decreases in older age group.

2.3.1 Gender

A study by Safwat *et al.* (2019) showed that the treatment success rate was more in male as compared to females. Greater delays have been reported in women by some studies (Chen *et al*., 2019), whereas gender was not significantly associated with patient delay in Ghana (Osei *et al.*, 2015). Samal (2016) reported that women preferred home remedies at the onset of symptoms than at the public health facility. A study in Russia reported "female gender" as a significant predictor of MDR-TB (Chaisson, *et al* 2016).

2.3.2 Poverty and location of patients

Studies in Kenya and Nigeria found TB patient delay to be longer in patients who had to borrow money for a hospital visit (MoH-Kenya, 2017; Onazi *et al*., 2015). Hinderaker *et al*. (2011) reported that delay in seeking healthcare was made worse for the poor exacerbating the ever-increasing cycle of poverty. In terms of location of patients, a study in Ethiopia led to the conclusion that patient residence was associated with delay in seeking healthcare of TB treatment (Awoke *et al*., 2019; Tsegaye *et al.*, 2016). Similarly, findings from a study conducted in Tanzania indicated that patient delay was significantly associated with the distance from patient's residence and health facility (Wandwalo & Mørkve, 2000). Patients residing in rural areas recorded substantially longer delay in commencing TB treatment that their urban counterparts. In these settings, these factors were associated with high likelihood of experiencing unsuccessful health outcomes.

2.3.3 Age

One of the predisposing characteristics that was revealed to be strongly linked to patient delay and connected to TB diagnosis and treatment delays was old age (Eltayeb et al., 2020). Similar findings were found by Loutet et al. (2018), who found that older age was linked to a longer overall treatment delay. Age-related delays in TB diagnosis ranged from roughly 15% for those under the age of 14 to 38.4% for those over the age of 65. (Loutet et al., 2018). In another study, shorter presentation delays were reported in children while evidence of longer healthcare delay trends

was observed among older populations in South East England (Roberts *et al*., 2020). The findings of a study conducted by Saldana *et al*., (2013) indicated that longer overall treatment delay was significantly influenced by age. In a study carried out in Tanzania, it was observed that patients aged 15-24 years and 65 years experienced a longer delay than those aged 25-34 years (Hinderaker *et al*., 2011).

2.4 Proportion of TB contacts associated with delayed TB treatment

TB contacts should be investigated systematically and actively for TB infection and disease. This contributes to early identification of active TB. Untreated smear positive cases of TB lead to development of infection of about ten contacts annually and over twenty contacts during the natural history of the disease until death occurs (Seid & Metaferia, 2018).

Contact investigation has been proposed as a worthwhile strategy to enhance early detection of TB cases and reduce transmission in high incidence localities (Ohene *et al*., 2018). Reviews of studies from low- and middle-income settings looking at contact investigation for TB have reported the proportions of active TB in all contacts to be in the range of 3.1–4.5% and that for micro-biologically proven TB to be 1.2–2.3% (Ohene *et al*., 2018). One of the challenges identified in the 2009–2013 National Tuberculosis Control Program (NTP) Strategic Plan was the low TB case detection rate in Ghana, estimated at 36% of pulmonary smear positive cases (Ohene *et al*., 2018).

Many studies in countries with a high TB incidence have shown that the proportions may reach 5% or more among contacts, particularly among household members. Worldwide, highly infectious, smear positive pulmonary TB develops in over 4 million people annually according to WHO estimates (WHO, 2016b). According to WHO global TB report 2016, in 2015 there was estimated 10.4 million new TB cases worldwide. About 4.3 million representing more than 40% was not notified (ReliefWeb, 2016). Reviews from studies carried out in low- and middle-income settings on contact investigation for TB reported active TB proportions of 3.1-4.5% microbiologically proven active TB proportions stood at 1.3-2.3% (Fox *et al*., 2013).

2.5 Health system factors related with delay in commencement of TB treatment drugs

There has been a remarkable development in TB treatment over the past 10 years. WHO prioritizes reaching out to populations in need rapidly when new TB treatment drugs emerge (World Health Organisation, 2014). Included in the health system factors are several pillars namely, service delivery, resources which include human, time and monetary; commodities and drugs, leadership and governance, infrastructure and transport, health information and data collection (WHO, 2010). Weak health systems present many barriers to effective control of TB. Strengthening these pillars of the health system should give rise to positive system effects and this policy is among six components of the WHO Stop TB strategy (WHO, 2008).

In a population based medical record review the mean health care institution delays varied based on the level of health care facilities. Chest specialty hospitals recorded the least mean delay followed by medical centres, regional hospitals and district hospitals. The chest specialty hospitals recorded the lowest mortality rates and successful treatment outcomes (WHO, 2016a).

There are several factors which can cause delay in starting TB treatment drugs. They include poor road networks, lack of adequate surveillance systems, and inadequate diagnostic machine-like Gene Xpert (Gebreweld *et al*., 2018; Weyer *et al*., 2013).

2.6 Social cultural factors related with delay in commencement of TB treatment drugs

The twin issues of delaying therapy and stopping a prescribed regimen are the result of complicated considerations. The complexity is exacerbated by people's misunderstanding of the implications of tuberculosis symptoms, transportation costs to clinic services, the social stigma associated with tuberculosis, the high cost of medication, organizational issues with providing adequate follow-up services, and patients' perception of clinic facilities as unwelcoming (Rubel & Garro, 1992).

2.6.1 Social isolation and stigma

The ways in which people react to illness or diseases are strongly connected to broader social and cultural process. Stigma is a useful concept to analyze some of the issues facing people with diseases such as TB. Despite the availability of an affective cure, TB patients experience strong social stigma in many parts of the world due to the discrediting status they receive from family and community due to their illness (Cremers *et al*., 2015). The close association between HIV/AIDS and TB in the parts of the world makes social stigma more profound (Cremers *et al*., 2015). Additionally, a person diagnosed with TB maybe subjected to a form of social-Isolation, encouraging separations in familial and social relations. This might bring in many effects including shame and embracement, fear of or actual job loss, fear of contagion and social isolation (Yılmaz & Dedelı, 2016).

An examination of various social issues that TB patients have to endure contributes to understanding the synergistic effects of stigma and social situations. Studies conducted in Zambia, south Africa and Kenya shows that family members maintain various social taboo such as not sharing food, kitchen utensils and beds with TB patients (Yılmaz & Dedelı, 2016). Dealing with TB requires exploring local conceptualization of TB and cultural interpretations. Dominant taboos can weaken over time (Mason *et al*., 2015). Learning to understand the social basis of stigma and social practices, in any particular setting helps TB clinicians and researchers to navigate and contest the isolating practices that impact negatively upon health-seeking behavior and treatment compliance for treatable and unnecessary stigmatized TB disease (Mason *et al*., 2015).

Addressing the broader social, and structural forces that shape the TB patients experience of stigma will lead to positive transformations of TB care and prevention. There is a need to develop new technologies and restructuring social organization as effective strategies for stigma reduction on TB (Mason *et al*., 2015). A broader theoretical understanding of people's health beliefs and concerns about TB can inform and clarify existing perceptions and misconceptions and enhance a better understanding of the gravity of TB disease (Mason *et al*., 2015). These beliefs might

thus be better shaped by such factors as social support, access to timely diagnosis, and appropriate treatment facilities.

Perceptions and beliefs that members of communities have about TB are important factors that help shed more light on why diagnosis may be delayed (Nyasulu *et al*., 2018). There are limited data on the social and cultural aspects of TB, as most studies have mostly focused on clinical and operational research. The outcomes from this study would contribute to the designing and implementation of TB community-outreach programs and inform the development of a health-education model to correct misconceptions, erroneous beliefs, attitudes, and perceptions for the rural community.

2.6.2 Religion

The concept of health based on religion is still rooted in the discursive memory of many individuals and continues to produce the same effects observed for millennia, when the magical-religious or ontological concept prevailed, according to which disease arises from the action of supernatural forces, and healing is subject to divine will or sacred rituals (Mulemi, 2014; Rumun, 2014). In another study, it was observed that treatment adherence in New Guinea was influenced by religion whereby having religious beliefs and faith in God encouraged treatment adherence (Diefenbach-Elstob *et al*., 2017). Visiting traditional healers on the onset of TB symptoms was reported as a common behavior among patients in Ghana (Noora *et al*., 2020). TB patients first visited traditional healers before going to the health facility. Buying drugs over the counter has been associated with delay in starting TB treatment (Viney *et al*., 2014).

2.6.3 Cultural and traditional practices

According to Mbuthia *et al*. (2018), the myths concerning cultural perceptions of the cause of TB encourage alternative approaches such as traditional healers and herbalists instead of pursuing modern medicine. Similarly, Sima *et al*. (2017) asserted that witchcraft, hard work and sexual over indulgence are some of social-cultural factors associated with delay in TB treatment. Nyasulu *et al*. (2016) reported

that cultural practices, traditional beliefs and witchcraft are believed to be the cause of illness, and are a major contributor to delay in TB diagnosis and treatment. Another study conducted in South Africa concluded that people linked the breakage of cultural norms to TB transmission whose remedy was traditional medicine (Edginton *et al*., 2002). Such beliefs and myths need to be targeted by creating awareness because they usually contribute to delayed treatment, high transmission rates of TB in the community and the risk of development of multi-drug restraint strains (Mbuthia *et al*., 2018).

CHAPTER THREE

METHODOLOGY

3.1 Study site

The research was carried out in Msambweni county referral hospital and Kwale sub-county hospital which are located in Kwale County, Kenya. Kwale County is located at 4.1816° S, 39.4606°E and is one of six counties in the coastal region. It covers an area of 8,270.3 km^2 with a population of 866,820 people. The study area was selected because contributes 8% of total PTB cases in Kenya (NTLD-P, 2017). Msambweni County referral hospital (428.8073°S, 03928.8606°E) and Kwale sub-county hospital (410.4605°S, 03927.3847°E) were chosen as the study sites because they are the main facilities offering TB diagnostic and treatment services in the county. Msambweni County Referral Hospital (MCRH) is the main referral health facility in Kwale County. The hospital has 155 inpatient beds and189 healthcare workers. Kwale sub-county hospital is a Ministry of Health primary care hospital located in Tsimba Golini (Kwale Town, Likoni Kinango Road) Matuga in Kwale County As of 2021, the facility was fully operational with a capacity of 62 beds and 3 cots. It is regulated by Ministry of Health under registration number 11507. The two hospitals offers TB and HIV testing and treatment, nutrition services, family planning as well as other inpatient and outpatient services.

3.2 Research Design

The researcher used cross-sectional research design including patients diagnosed with TB in Msambweni county referral hospital and Kwale sub-county hospital in Kwale County, Kenya.

3.3 Target Population

The study population consisted of newly diagnosed PTB patients and PTB patients in the intensive phase of TB treatment who seek treatment from the two public health

facilities namely Msambweni County referral hospital and Kwale sub-county hospital during the 8-week period of survey.

3.4 Sampling

Two government/public health facilities in Kwale County, Kenya. Namely; Kwale sub-County hospital and Msambweni County Referral Hospital, Kenya were purposively selected. They two hospitals had were selected as study sites because they reported high TB caseloads in 2017 that is 297 cases in Msambweni County Referral Hospital and 250 cases in Kwale Sub County hospital.

3.5 Sample Size Determination

The study used 30 days as the cut-off point to dichotomize the patient sample into those with lesser and longer delay.

Sample size (n) was calculated using Fischer formulae (Fischer *et al*., 1998).

"N" was the estimate population of PTB patients in the intensive phase of TB treatment aged 18 years and above in Kwale County, Kenya. In the last quarter of 2017, N was a total 547 PTB patients in Kwale sub-County hospital and Msambweni County Referral Hospitals in Kwale County.

The sample size was computed using Fischers equation as follows;

$$nf = \frac{n}{\left(1+\frac{n}{N}\right)}$$

Where nf is the desired sample size (when the target population is less than 10,000)

n is the desired sample size when the population is at least 10,000 or infinite

N is the population size

$$n = \frac{z^2 pq}{d^2}$$

Z is the normal standard deviate at the required confidence level (1.96)

is the proportion in the target population estimated to have the characteristics being measured

$$q = 1 - p$$

d is the level of statistical significance set (0.05)

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384$$

Therefore, $nf = \frac{384}{\left(1 + \frac{384}{547}\right)} \approx 226$

To take care of non-response additional 8 questionnaires were added bringing total sample size to 234.

3.5.1 Calculation of sample interval sampling

Interval sampling was used to select study participants in the health facilities. The sampling interval was computed as follows:

Interval sampling = Total population ÷ sample size

Total population 547

Sample size 234

Therefore, 547÷234=2.3

Sample interval =2

Disproportional distribution of sample was used whereby 117 patients were selected in each health facility. The first respondent was randomly selected and the subsequent respondents were selected based on an interval of two.

3.5.2 Inclusion criteria

This study included:
a) All the newly diagnosed PTB patients and PTB patients in the intensive phase of TB treatment who sought treatment at Kwale sub-county hospital, and Msambweni County referral hospital, Kenya.
b) PTB patients who consented to participate in the study.

2.5.3 Exclusion criteria

a) Re-treatment were excluded because of the possibility of not being able to remember with a fair degree of accuracy the length of delay before they sought the first treatment
b) Very sick patients e.g those admitted in the intensive care unit and mentally sick patients
c) EPTB patients were excluded since they do not exhibit cough and thus in most cases they there is late detection of TB.

3.6 Data Collection Instruments

3.6.1 Interviewer assisted structured questionnaire

An interviewer assisted structured questionnaire was used to collect the quantitative data. The questionnaire had two parts. Part A comprised of 6 questions that sought socio-demographic information and part B that sought TB treatment delay among the study respondents.

3.6.2 A key informant interview guide

A Key Informant Interview (KII) was used to collect the qualitative data. Fourteen (14) Community health volunteers attached to Kwale County hospital and Msabweni

County Referral Hospitals were identified as KII of this study. The KII guide had two sets of questions aimed at seeking to understand health system related factors and sociocultural factors linked with TB treatment delay.

3.6.3 Reliability of the data collection instruments

To test the reliability and understandability of the questionnaires, piloting was conducted using 24 questionnaires before data collection. The Cronbach's alpha statistic was 0.78 which is within the satisfactory range of 0.58- 0.97 suggesting that the questionnaire was reliable for measuring the various variables.

3.6.4 Validity of the data collection instruments

To ensure validity of the data collection tools, the tools were subjected to expert validation to determine if the tool would measure what they were designed to measure as recommended by Bolarinwa, (2015). The results of the questionnaires were incorporated into the final data collected.

3.6.5 Data collection procedure

Data was collected via interviews and administration of structured questionnaires by trained data clerks under the supervision of the principal investigator.

The researcher and a research assistant conducted face to face interviews with smear positive PTB patients during their routine visits at the Kwale sub-County hospital and Msambweni County Referral Hospitals in Kwale County. Treatment delay was considered if TB treatment was initiated 8 weeks or longer after patient was diagnosed with TB (MoH, 2016).

3.6.6 Key informant interviews

For qualitative data, key informant interviews were conducted. Key informant 30-minute interviews were conducted with fourteen (14) key informants who were community health volunteers. Purposive sampling was used to select the KIIs. The key informant interview guide was developed based on the main thematic areas of

the quantitative data tools. Before conducting the key informant interviews, the key informants were taken through the essence of conducting the interview and informed consent was sought from them.

3.7 Data Analysis and processing

After data collection, two analytical tools were used to analyze interviews and questionnaires. Quantitative data was analyzed using SPSS version 20. Qualitative data was thematically analyzed using NVivo version 12. Quantitative data was analysed using descriptive analysis to determine the proportions of delayed TB treatment among TB patients. Data was subjected to probit binary regression analysis to determine socio demographic factors influencing delayed TB treatment. All the analysis was done at 95% confidence interval. Data was presented using frequency tables, pie chart, and correlation tables.

3.8 Ethical Considerations and approval

All participants were taken through a standard informed consent procedure consistent with international recommendations (Council for International Organizations of Medical Sciences (CIOMS) in collaboration with the World Health Organization (WHO, 2000). Privacy and confidentiality were employed to ensure that the data collected from respondents was kept safe, free from interference and protected from unwanted use. Respondents were assured that their participation was voluntary and that they could withdraw from the study at any time. Informed consent was obtained before administration of questionnaire. The participants were identified using unique identifiers assigned to them. Participants were informed that participation in the study would not have any risks, financial benefits and the interview would Completed study tools were stored under lockable cabinets. All data were saved under password-restricted computer and only study-related personnel had access to study materials. Ethical approval was sought from the ethics committee of University of Eastern Africa Baraton before recruitment of participants. Authorization to carry out the study was sought from the Kwale County Director of Health.

3.9 Study limitations

Since the study was carried out in public hospitals it would not be able to capture those TB patients that were receiving TB treatment from private hospitals. The applicability of the findings was limited to the area of study but have potential to impact plans in other localities. Another important limitation was recall bias; it may have been difficult for some patients to accurately recall the events that occurred sometime ago.

CHAPTER FOUR

RESULTS

4.1 Reliability test results

The study sought to determine whether data collection instrument used had the items that would collect reliable data. The data was collected from 24 study participants. The results obtained shows reliability was ensured and are presented below in Table 4.1.

Variable	Cronbach's alpha	No. of items
Socio demographic factors	0.78	8

4.2 Socio-demographic Characteristics of Respondents

The following table represents a summary of data on the socio-demographic characteristics of respondents.

Table 4.1: Summary of socio-demographic Characteristics of the Respondents

Variables	Categories	Frequency	Percent	Cumulative Percent
Respondent's age	18 to 20 years	45	19.7	19.7
	21 to 25 years	32	14.0	33.6
	26 to 30 years	25	10.9	44.5
	31 to 35 years	36	15.7	60.3
	36 to 40 years	42	18.3	78.6
	41 to 45 years	26	11.4	90.0
	over 45 years	23	10.0	100.0
	Total	229	100.0	
Gender	Male	140	61.1	61.1
	Female	89	38.9	100.0
	Total	229	100.0	
No. of children	1 Child	38	16.6	16.6
	2 Children	38	16.6	33.2
	3 children	31	13.5	46.7
	4 Children	9	3.9	50.7
	5 children	24	10.5	61.1
	Over 6 children	16	7.0	68.1
	No Child	73	31.9	100.0
	Total	229	100.0	
Respondent's Education Level	No formal Education	10	4.4	4.4
	Primary level	69	30.1	34.5
	Secondary level	94	41.0	75.5
	Tertiary (college/University)	56	24.5	100.0
	Total	229	100.0	
Respondent's Employment Status	Employed	69	30.1	30.1
	Not employed	160	69.9	100.0
	Total	229	100.0	
Respondent's Marital status	Single	79	34.5	34.5
	Married	131	57.2	91.7
	Separated	13	5.7	97.4
	Divorced	4	1.7	99.1
	Widowed	2	.9	100.0
	Total	229	100.0	
Respondent's Income in Kenya SHS	<10,000	130	56.8	56.8
	10,001-20,000	64	27.9	84.7
	20,001-30,000	11	4.8	89.5
	>30,000	24	10.5	100.0
	Total	229	100.0	

4.3 Proportions of TB Delay

The proportion of TB patients who started TB treatment in time was 30.6% (n= 229) while those who delayed starting TB treatment was high at 69.4% (n= 229). This data is summarized by the following table and pie chart**.**

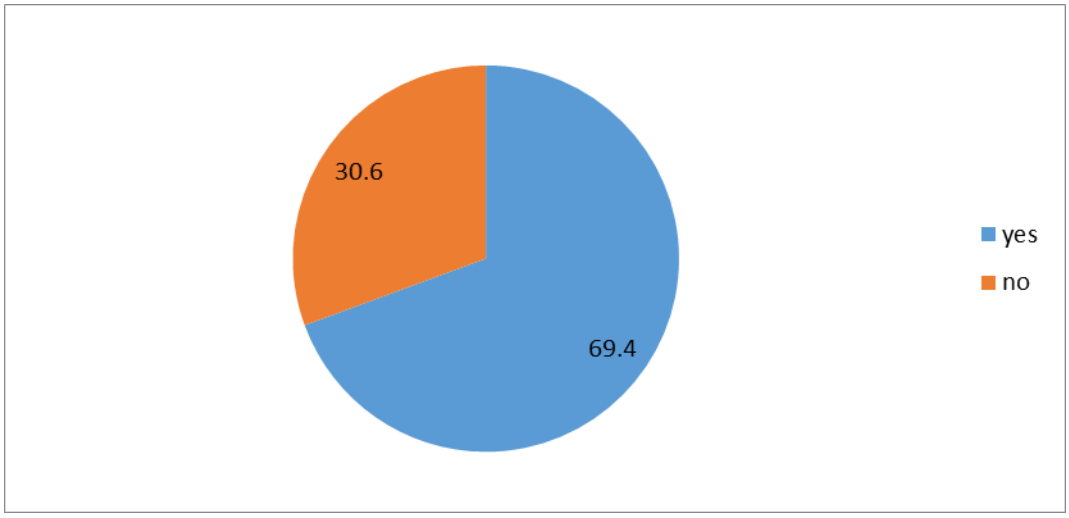

Figure 4.1: Proportion of TB Treatment Delay

4.4 Sociodemographic factors influencing TB treatment delay

There was statistical significant association between level of education and treatment delay where a majority of the TB patients who delayed treatment had secondary school and primary school education while the least had no formal education. Additionally, there was statistical significant association between employment status and treatment delay where a majority of the TB patients who delayed treatment were not employed.

4.4.1 Association of socio demographic characteristics and treatment delay

Table 4.2: Socio demographic factors associated with TB treatment delay

Variables	Treatment delay		P value
	Yes	**No**	
	F (%)	**F (%)**	
Level of education			
No formal education	9(3.9)	1(0.4)	**0.023**
Primary education	54(23.6%)	15(6.6%)	
Secondary	62(27.1%)	32(14%)	
Tertiary (College/University)	34(14.8%)	22(9.6%)	
Employment status			
Employed	59 (25.8%)	10 (4.4%)	**0.006**
Not employed	100 (43.6%)	60 (26.2%)	

4.4.2 Socio-demographic factors influencing delay in commencement of TB treatment in Kwale County, Kenya

A Binary regression analysis was conducted with delay in TB treatment as dependent variable against socio-demographic characteristic of respondents as independent variables which include (respodents age, gender, parity, level of education, occupation, marital status and income). The results indicated that gender (OR 8.026, 95% CI of OR: 3.659-17.608, P<0.05) level of education (OR 2.381, 95% CI of OR: 1.413-4.011, P<0.05) and employment status (OR 6.146, 95% CI of OR: 2.086-18.080, P<0.05) influenced delay in seeking TB treatment. Respondent's age, parity, occupation, marital status and average household income did not influence delay in TB treatment. This data is summarized in the following table (Table 4.3).

Table 4.3: Socio-Demographic Factors influencing Delay in TB Treatment

Variables in the Equation								
							95% EXP(B)	C.I.for
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Age of respondents	-.186	.121	2.334	1	.127	.831	.655	1.054
Respondents gender	**2.083**	**.401**	**26.998**	**1**	**.000**	**8.026**	**3.659**	**17.608**
Respondent's Parity	.001	.120	.000	1	.996	1.001	.791	1.265
Level of education	**.868**	**.266**	**10.629**	**1**	**.001**	**2.381**	**1.413**	**4.011**
Employment Status	**1.816**	**.550**	**10.881**	**1**	**.001**	**6.146**	**2.089**	**18.080**
Respondents Occupation	.235	.221	1.134	1	.287	1.265	.821	1.951
Marital status	-.417	.363	1.322	1	.250	.659	.323	1.342
Constant	-8.088	1.915	17.840	1	.000	.000		
Constant	-8.088	1.915	17.840	1	.000	.000		

a.

4.5 Health systems factors related with delay in the commencement of TB treatment in Kwale County, Kenya

Three thematic areas emerged in the qualitative data collected to assess health system factors associated with delay in commencing TB treatment. These are; lack of diagnostic machines for early TB diagnosis, Weak surveillance systems to detect TB cases, and poor road networks. Out of the 14 key informants interviewed, 9-11 agreed that lack of diagnostic machine-like gene expert for early TB diagnosis, Weak Surveillance systems to detect TB cases, Poor roads network are associated with delayed TB treatment. However, some had descending views. The following data is from key informants;

Table 4.4: Health systems factors related with delay in the commencement of TB treatment in Kwale County, Kenya

Factors	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv	Total
Lack of early diagnosis due to lack of sufficient TB diagnostic resources and machines	√	√	√	√		√	√	√		√	√			√	10
Weak surveillance system to detect TB cases		√	√		√	√	√	√	√	√	√	√		√	11
Poor roads network	√	√	√	√		√	√	√		√		√			9

A. Theme A: Lack of early diagnosis due to insufficient TB diagnostic machines and resources:

Ten out of fourteen informants asserted that poor diagnostic infrastructure was one of the key factors contributing to the delay in TB diagnosis and treatment, and this might lead to cases of misdiagnosis.

> *"Gene X-pert machine in this health facility has broken down" key informant" No. 3*

> *"We have the TB diagnostic machines but at times we have no reagents key informant" no. 2*

B. Theme B. Weak Surveillance systems to detect TB cases.

Eleven out of fourteen key informants in both Msambweni and Kwale sub-county hospitals mentioned that poor surveillance contributed to delayed diagnosis and treatment-non-conformance. Inadequacy of trained personnel to carry out surveillance tasks remains a huge challenge.

> "*We have no adequate and well-trained health workers working in chest and TB clinics hence many TB cases pass undetected" Key informant no. 7*

> *"In this County we only have two hospitals with proper and functional Gene expert machine to diagnose TB". The hospitals are Msambweni County Referral hospital, and Kwale subcounty hospital. The other health facilities lack the necessary equipment and staff to diagnose TB early" Key Informant No. 1*

> *"We have very few experts who are highly motivated to diagnose TB". Key Informant No. 4*

> *"Our TB experts come during clinic days which is once per week in this facility". Key Informant No. 1*

C. Theme C: Poor roads network.

Sixty four percent (64%) of the key informants reported that poor roads acted as a big challenge discouraging resident from seeking health services and following treatment regimen.

> "*During rainy season, the roads are worse. Our patients live far away and they cannot come during their TB clinic days to collect drugs". Key Informant No. 2*

> *"Vehicles charge very high fares when it rains which our patients cannot afford making them not to visit our health facility for TB screening and diagnosis". Key Informant No. 7*

4.6 Social cultural factors linked with delay in commencement of TB treatment in Kwale County, Kenya

The data gathered to explore the socio-cultural factors influencing the delay in starting TB treatment revealed a total of six thematic areas. Socio-stigma, TB positive people disputing positive TB diagnoses, searching out alternative conventional treatments, believing in witchcraft, thinking that TB is a common inherited trait from a father, religious concerns, and buying over-the-counter medications are a few of them. A total of 14 key informants were interviewed. Out of 14 community health village volunteers, more than 7 of them agreed that Social-Stigma, Religious Issues, TB patients dispute a positive TB diagnosis, seeking alternative treatment, believe in Witch Craft, TB disease is a result of inheritance and curse from fore-fathers and Buying drugs over the counter are associated with delayed TB treatment. The following data is from the key informants;

Table 4.5: Social cultural factors related with delay in commencement of TB treatment in Kwale County, Kenya

Factors	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv	Total
Social stigma	√		√	√		√		√		√		√	√		8
Tb patients dispute a positive TB diagnosis		√	√		√		√	√	√	√			√	√	9
Seeking alternative treatment	√	√		√	√		√	√		√		√	√	√	10
Believe in witchcraft			√		√	√		√	√	√			√	√	8
TB disease is a result of inheritance and curse from fore fathers		√	√	√		√	√	√	√	√	√	√	√		11
Religious issues	√	√		√	√		√	√		√		√	√	√	10
Buying drugs over the counter	√	√	√		√	√	√	√	√						8

A. Theme A: Social- Stigma

Eight out of fourteen key informants agreed that patients believed that being associated with TB would cause them stigmatization such as people gossiping about them and exclusion from family gatherings which results in many of them hiding their diagnosis or only disclosing it to specific people. This is usually because TB is associated with HIV/AIDS. Some of these patients are usually reluctant to visit health facilities for fear of being seen. The community health workers pointed out that the stigma usually begins from the immediate family who restrain their contact or interaction with the patients.

"Majority of TB patients fear they will be isolated by loved ones because TB is associated with HIV/AIDs". Key Informant No 2. 3, 4

B. Theme B: TB patients dispute a positive TB diagnosis.

Nine out of fourteen noted that many patients upon receiving their diagnosis are skeptical and refuse to accept that they TB positive as they believe the disease to be rare and difficult to contract.

"Some TB patients think that the doctor/health worker made a wrong diagnosis hence they do not take drugs as fast as recommended". Key Informant No 4

"Some think its asthma or chronic bronchitis hence they ignore starting anti TB drugs early". Key Informant No 6

"Others think that the cough associated with TB is as a result of excessive cigarette smoking hence, they do not need treatment". Key Informant No. 5

C. Theme C: Seeking alternative treatment.

Ten out of fourteen of the participants reported that according to patients in the region, there was no need to seek treatment from modern health facilities as this was not only expensive, but good alternative medicine was affordable and locally available. They preferred herbal medicine arguing that during old days before conventional medicine came along, people successfully relied on local herbs.

"Some TB patients believe that taking herbs is more effective than modern TB treatment". Key Informant No 2, 3, 6, 7

D. Theme D: Believe in Witch Craft.

Eight out of fourteen reported that ailment was not as a result of natural causes, but was caused but witchcraft and evil spirits and that only traditional healers could treat such illnesses.

"Some TB patients believe they have been bewitched and ignore all medical advice and seek solution from witch Doctors". Key Informant No 3 and 4

Therefore, the participants reported that residents visited traditional healers first before visiting modern health facilities which they only do when the illness becomes severe.

E. Theme E: TB disease is a result of inheritance and curse from fore-fathers.

Some participants (79%) believed that diseases were inherited from their forefathers and ancestors and that only traditional rituals would heal them.

"We inherited this disease and it runs in our families" Key Informant No 3

"This disease is a curse from God or from our ancestors for not appeasing them" Conducting our rituals will cure the disease not TB drugs". Key Informant No 8

F. Theme F: Religious Issues.

According to ten out of fourteen participants, patients often believed that ultimately, healing comes from God and not conventional treatment or drugs, and that only by praying to him would they get healed.

"Prayer can heal TB not Tb drugs". Key Informant No.8

"I do not believe in conventional treatment of TB, only faith can heal TB disease". Key Informant No. 4, 5, 6

G. Theme G: Buying drugs over the counter.

Eight out of 14 participants reported that upon experiencing illness symptoms, many patients often resorted to self-medication using over-the counter drugs before seeking another form of healthcare.

"Some TB patients buy drugs over the counter to treat their chronic cough and is thought to be easier and cheaper than visiting TB clinics which wastes a lot of time to get diagnosis and treatment". Key Informant no. 3

CHAPTER FIVE

DISCUSSION

5.1 Proportion of patients who delay TB Treatment

The proportion of confirmed TB patients who delayed on treatment was observed to be high at 69.4% (Figure 4.1). These findings are in alignment with the findings of a study conducted in Nigeria which indicated that close to 50% of newly diagnosed TB patients had a prolonged delay in commencing TB treatment (Seid & Metaferia, 2018). Similarly, a study conducted in Montenegro reported delay in commencement of TB treatment to be 51 % (Bojovic *et al.*, 2018). The studies suggest that there is a tendency of delay in seeking treatment among newly diagnosed TB patients in developing countries and in this regard, Kenya is not exceptional. Other studies conducted in different parts of Kenya also reported high proportions of delay in TB treatment among newly diagnosed patients (Mbuthia *et al*., 2018; Nyatichi & Amimo, 2016).

5.2 Socio-Demographic determinants of Delay in TB Treatment

Three socio-demographic factors were found to influence TB treatment delay. They are: level of education, gender and employment status. In regard to level of education, it is generally expected that an educated person would be knowledgeable on the need to seek treatment promptly. In this study however the highest percentage of delays in seeking treatment was observed among TB patients with secondary level of education (27.1%) followed by those with primary level of education (23.6%) and the least percentage among patients without any formal education (3.9%) as shown in table 4.3. These results may be explained by the lack of a better comprehension of the significance of timely seeking and starting TB treatment among patients with secondary and primary levels of education. Compared to patients with secondary and basic education levels, those with tertiary education were less likely to encounter treatment delays. This could be attributed to increased awareness of the disease and the fact that educated people are more likely to get a job and thus more likely to seek medical care promptly (Kilpeläinen et al., 2020). These findings are in conflict with

the results of a study conducted in Southern Ethiopia which identified failure to acquire formal education as a determinant for delay in seeking TB treatment (Awoke *et al,*2019). Similarly. Reported that patients with tertiary level of education were less likely to delay in seeking and initiating TB treatment compared to those with primary and secondary levels of education (Asefa & Teshome, 2014).

With regards to Employment status, it was observed that 43.6% of unemployed people delayed in seeking TB treatment compared to employed patients (25.8%). This could be attributed to the fact that unlike their employed counterparts, unemployed patients lack a stable income to enable them seek health care. The delay among the unemployed group of TB patients could also be due to the social cultural issues reported in objective four which indicate that TB patients are highly likely to seek alternative treatment methods. These findings are in agreement with those reported by other researchers such as Adenager *et al*., (2017) who observed that employment status was associated with delay in seeking TB treatment in a study conducted in Addis Ababa. Similarly, Noora *et al*., (2020) reported that unemployed TB patients were approximately 7 times more likely to delay in seeking and initiating treatment compared to their employed counterparts. Male patients are more times likely to delay TB treatment 8 times more than females (Thompson *et al* (2016). This probably due to the fact that females have good health seeking behaviour than males.

5.3 Health systems factors related with delay in the commencement of TB treatment in Kwale County, Kenya

Out of the 14 key informants interviewed, 10 agreed that inadequate diagnostic machines-like gene expert for early TB diagnosis, Weak Surveillance systems to detect TB cases, Poor roads network are associated with delayed TB treatment. However, 4 had descending views.

Themes identified in the qualitative data regarding the health system related factors influencing delay in TB treatment among TB positive patients included lack of early diagnosis due to inadequacy of Tb diagnostic machines in other health facilities, poor

TB surveillance systems and poor road networks as main factors that contribute to delay in starting TB treatment.

Insufficiency of diagnostic machines in health centres denies health workers the chance to test patients on their TB status. Hence many TB cases will remain in the population undetected and such cases will delay in seeking treatment simply because they do not know their TB status. Previous studies have produced evidence supporting findings of this study. In Zimbabwe, lack of a Gene Expert machine in health facilities was associated with delay in diagnosis and subsequently a delay in starting TB treatment (Takarinda *et al.,* 2015). Similarly in a study conducted in Italy, it was reported that lack of diagnosis of TB patients was one of the factors causing delay in seeking TB treatment (Quattrocchi *et al*., 2018). Mbuthia *et al*., (2018) also in a study conducted in West Pokot county, Kenya reported that poor diagnostic capacity led to misdiagnosis which hampered timely diagnosis and subsequent treatment initiation.

In regard to TB surveillance system, a weak surveillance system does not have capacity to identify TB cases fast and put them on treatment, this again will lead to delay in seeking treatment by TB positive cases who do not know their status. The findings in this study agree with the results of a study conducted in Northern Nigeria that indicated poor surveillance system as a major cause of delay in seeking TB treatment (Seid & Metaferia, 2018).

Lastly, a poor transport network is a deterrent to seeking treatment from health facilities especially in poor resourced areas like Kwale County. TB cases may lack means of transport to reach to the nearby health facilities simply because the road network is poor. Patients too may fail to visit hospital due to a poor road network and this could potentially deny them a chance to get a TB diagnosis in time. The two scenarios then become potential sources of TB treatment delay. Poor transport system to deliver sputum and to seek medication has been established as a significant barrier to TB treatment hence a major cause of delay (Gebreweld *et al*., 2018).

5.4 Social cultural factors related with delay in commencement of TB treatment in Kwale County, Kenya

Out of 14 community health village volunteers, more than 8 of them agreed that Social- Stigma, Religious issues, TB patients dispute a positive TB diagnosis, seeking alternative treatment, belief in Witch Craft, TB disease is a result of inheritance and curse from fore-fathers and buying drugs over the counter are associated with delayed TB treatment while 2 had descending views.

The issues impacting the delay in starting TB treatment have been broken down into six subject themes. These include socio-stigma, TB positive people disputing their positive status, searching for alternative traditional treatments, believing in witchcraft, thinking that TB is a common inherited condition from a father, religious concerns, and buying over-the-counter medications.

In Kenya TB research indicates that TB patients are stigmatized in many communities. This is because in many instances, TB has been associated with the Human Immunodeficiency Virus (HIV) (Cremers *et al.*, 2015). For fear of stigmatization, newly diagnosed TB patients would avoid visiting health facilities to seek TB treatment and this could cause delay in treatment. Disputing any diagnosis is a potential reason for not seeking treatment simply because the sick person does not believe that they are sick. The fact that majority of TB patients in Kwale County believe that they cannot be suffering from TB even when the results turn out to be positive is a potential source of delay in TB treatment. Previous studies have also produced evidence suggesting that socio-cultural factors contribute to delay in TB treatment in different parts of the developing world. A study in Montenegro showed that people have a negative attitude towards TB which can be interpreted to mean not accepting a positive TB diagnosis caused delay in commencing TB treatment (Bojovic *et al.*, 2018). Similarly, a study conducted in Addis Ababa to identify factors leading to delay in TB treatment identified Stigma against TB patients as another major cause of delay in TB treatment (Adenager *et al.*, 2017). Stigma against TB patients has also been identified as a key social determinant of health seeking behavior among TB patients especially in causing delay in seeking and adhering to

treatment in countries with a low incidence of TB (Craig *et al.*, 2017) and (Adilo, 2017). In Zambia a study investigating the effect of stigma in TB treatment also identified delay and adherence to TB treatment as one of the effects (Cremers *et al*., 2015).

Seeking alternative treatment popularly referred to as '*miti shamba*' is another way of deferring modern TB treatment which in turn can lead to delay in starting TB treatment. Beliefs in Witchcraft will also contribute to delay in commencing TB treatment because sick people will pursue witchcraft to tray and treat the illness instead of taking the recommended medication. A study conducted among the pastoralists communities in Ethiopia identified witchcraft and stigma as a significant determinants of health seeking behavior which could delay seeking TB treatment (Sima *et al*., 2017).

Believing that TB is inheritance from the fore fathers makes community members take the disease as a normal occurrence and the urgency to seek treatment may not be there hence contributing to delays in seeking treatment. Belief in religious miracles has also been a barrier in the health seeking behaviors in many communities living in Kenya and the larger region. It is common to find people seeking recovery from illness through church miracles performed by their religious leaders. Beliefs the in such miraculous healing explains why newly diagnosed TB patients would fail to seek TB promptly and thus this leads to delay in seeking treatment. Religion has also been identified as a key determinant in seeking TB diagnosis and by extension a contributing factor to delayed TB treatment (Gone *et al*., 2018).

Lastly, self-medication has been reported as a serious problem influencing health seeking behaviors negatively in resource poor countries (Lei et al., 2018; Saha et al., 2022). The habit of seeking over the counter drugs anytime a person is sick without a doctor's diagnosis is rampant in Kenya and the region (Alwar & Oyugi, 2015; Nyambega, 2017). This explains why many TB positive patients might remain undiagnosed because they have been treating a cough or Flu using over the counter drugs. This in turn has potential to delay TB treatment because TB patients are not even aware, they have TB simply because they have been treating a different disease.

These findings are in alignment with those of a study conducted in Southern Ethiopia identified seeking non formal treatment as a major cause of delay in TB treatment (Awoke *et al*., 2019). Similarly in Zimbabwe, self-Medication has been associated with delay in TB treatment (Takarinda *et al.*, 2015).

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusions of this study

1. The proportions of delay in TB treatment in Kwale sub-County hospital and Msambweni County Referral Hospital of Kwale County was high at 69.4%. Majority of the respondents delayed TB treatment in line with objective two which sought to establish the proportions of TB treatment.
2. Socio demographic factors influencing delay in treatment of TB among newly diagnosed TB patients attending Kwale sub-County hospital and Msambweni County Referral Hospital in Kwale County were: level of education, gender and employment status.
3. Qualitative analysis showed that health care service-related factors such as inadequacy of diagnostic machines, poor TB surveillance systems and poor road network were important barriers to timely TB diagnosis and treatment among newly diagnosed TB patients attending Kwale sub-County hospital and Msambweni County Referral Hospital. Out of the 14 key informants interviewed, 10 health workers agreed that health systems influenced delay in TB treatment, 4 disagreed.
4. Socio cultural factors such as socio-stigma, positive TB dispute by TB positive patients, seeking alternative traditional treatment, belief in witchcraft, belief that TB is inherited from forefathers, religious issues, and buying drugs over the counter were reported to be barriers to early in TB diagnosis and treatment. Out of the 14 community health village volunteers (CHV's) more than 8 of the respondents on each thematic area agreed that social-cultural factors were linked to delay in TB treatment**.**

6.2 Recommendations

The following are recommendations in this study

1. There is need for the county government health docket to operationalize the strategies and policies to improve TB diagnosis and treatment commencement and encourage establishment of community-based initiatives to support efforts in reducing delayed TB diagnosis and treatment.
2. The government to ensure accessibility to both formal and informal education to enhance knowledge among people of all ages. Additionally, the government needs to create more employment opportunities to improve the people's income status which will in turn promote health seeking behaviours.
3. Government should invest in Gene expert machines in other health facilities in the region in order to improve TB diagnostic services as well as improving the transport networks for better accessibility to health facilities. Additionally, there is need for the county health department to strengthen surveillance systems.
4. Health education and awareness creation on causes and treatment of TB should be conducted intensively and continuously in Kwale County to help dispel the socio-cultural myths and stigmatization associated with TB illness and treatment. There is also need to ensure constant education on the dangers of self- medication and seeking alternative treatments ('*miti shamba*').

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APPENDICES

Appendix I: Consent Form

Name of Researcher: BAKARI M JUMA

Institution: Jomo Kenyatta University of Agriculture and Technology

Title of Study: Factors and proportions associated with delay in commencement of Ant-Tb in Kwale County, Kenya.

Request: I request you to take part in a research study. The research study aims to determine factors and proportions associated with delay in commencement of TB drugs among patients in Kwale County, Kenya. Understanding of these factors will help ease the burden of the epidemic in the county and our country at large. It will help policy makers to make more informed decisions on tackling the disease.

Risks and benefits: The study will not pose any risks to you. This study may help to improve our understanding, prevention and reduction of delay in treatment of TB in future. There will be no costs to you for taking part in this study.

Confidentiality: All Information obtained about you will be kept confidential and will be used only for the purposes of the study. Your name will not be required. The results of the study may be published or disseminated without revealing your identity.

Consent: You are free to take part or to withdraw from the study, there will be no penalty.

Questions: If you have any questions, concerns or complaints about the study, don't hesitate to call Bakari M Juma on 0714083617**Signatures:** Your signature below indicates that you agree to participate in this study. You will receive a copy of this signed document.

_____ _____

Signature of participant Date

_____ _____

Signature of Researcher Date

Appendix II: Questionnaire

SECTION 1: Demographic Information

100. what is your gender?

1. Male ☐
2. Female ☐
3. Intersex ☐

101. How old are you?

1. 16-20 Years ☐
2. 21-25 Years ☐
3. 26-30 Years ☐
4. 31-35 Years ☐
5. 36-40 Years ☐
6. 41-45 Years ☐
7. Over 45 Years ☐

102. How many children have you given birth to? (Seek to get total number of children born of the respondent both alive and still births (these who did not survive)

1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. Over 6 ☐

103. What is your level of Education?

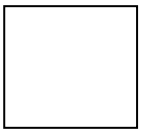
0. No formal education at all
1. Primary
2. Secondary ☐

3. College/university

104. Are you employed?

1. yes

2. No



106. What is your Marital Status?

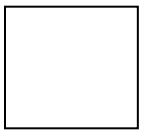
1. Single

2. Married

3. Separated

4. Divorced

5.widowed



108. What is your combined (your income + your spouse income) average total monthly income in Kshs._____

TB TREATMENT DELAY

108. When did you get diagnosed with TB?

---

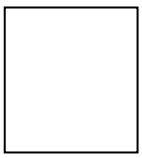
109. After your Diagnosis when did you start TB treatment.

1. Immediately After Diagnosis

2. Two weeks After Diagnosis

3. Two weeks to one month after Diagnosis

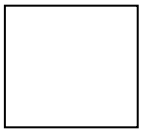
4. More than one month after diagnosis



110. TB treatment

1. Delayed

2. Not Delayed



Appendix III: Key Informant Interview Question Guide

SECTION A: Health Related System Factors

A. Do you think we have cases of delayed TB treatment?

1. YES ☐

2. NO

B. Do you think we have any health issues that can cause delay in starting TB treatment?

1. YES ☐

2. NO

C. What are the health related issues causing delay in TB treatment?

_____

_____

_____

_____

_____

D. How are the road networks between your residence and health facilities?

1. GOOD
2. BAD

E. Does the road and transport status play a part in your decision-making process regarding TB treatment? How?

_____

_____

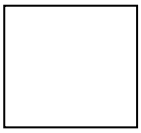
_____

_____

_____

SOCIAL CULTURAL FACTORS

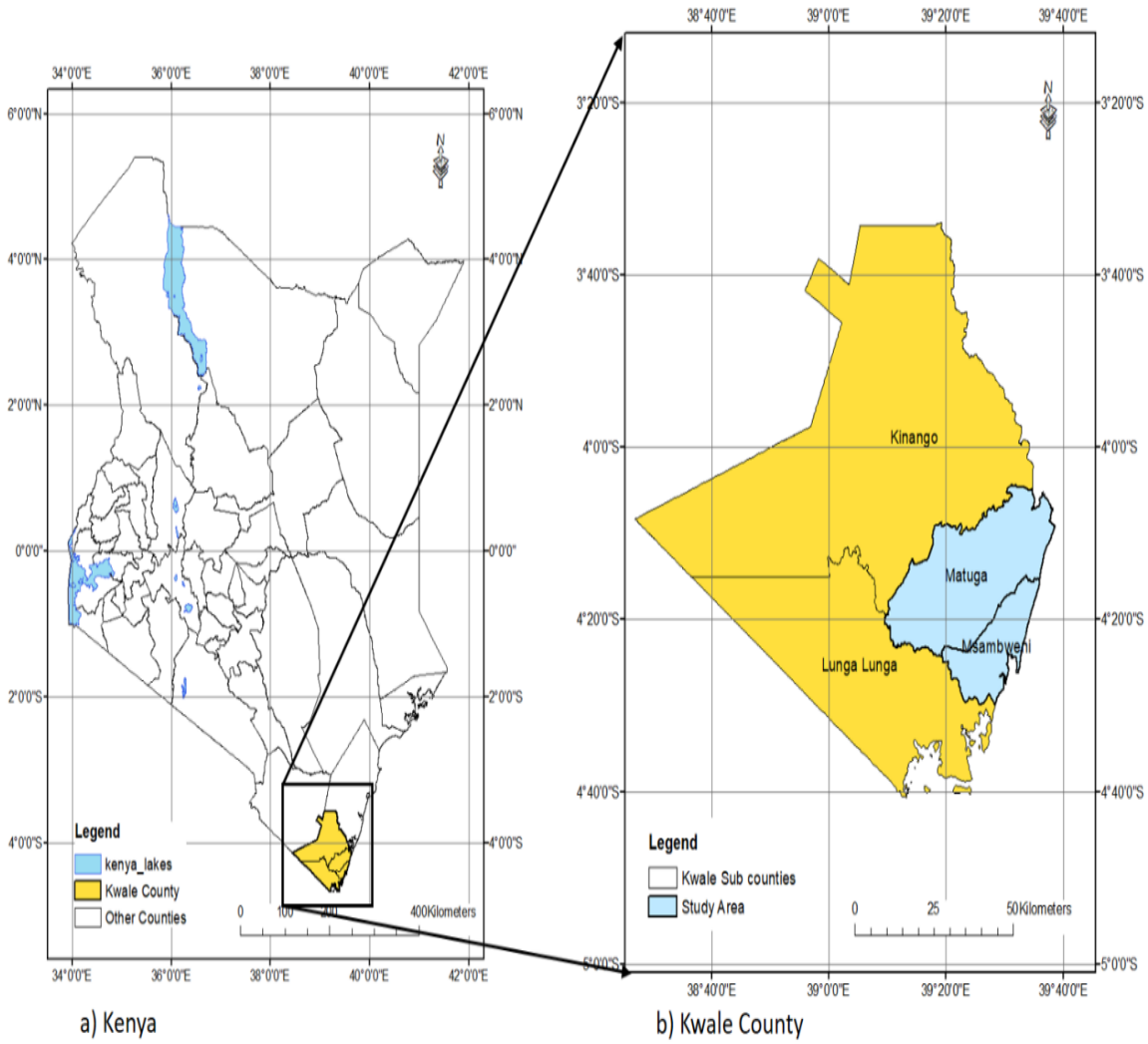
1. Do you think we have sociocultural issues that can cause delay in starting TB treatment?
   1. YES
   2. NO

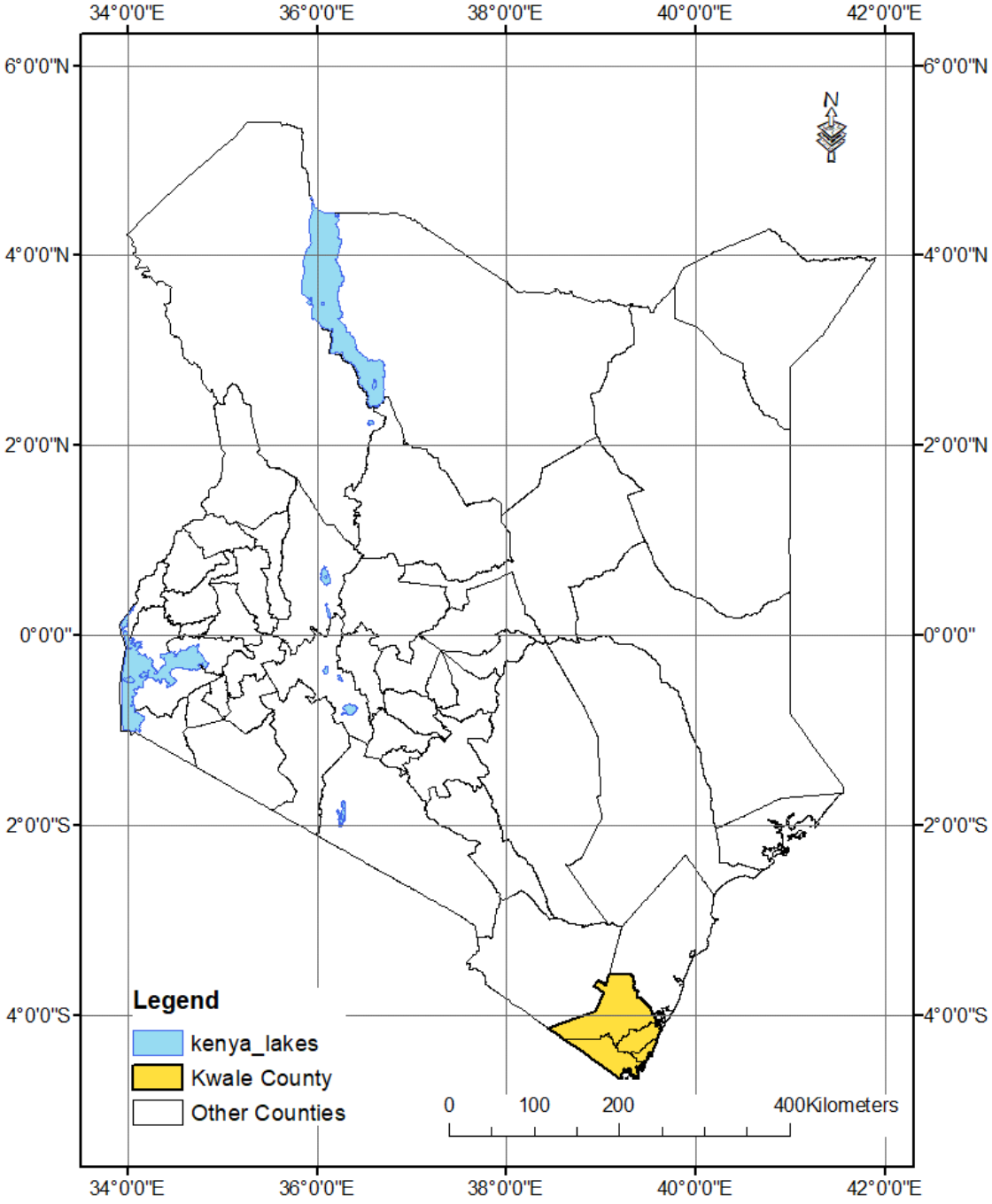


2. What are the sociocultural issues causing delay in starting TB treatment in this community?

_____
_____
_____
_____
_____
_____
_____
_____

Appendix IV: Map of Kwale County, Kenya, showing study areas

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0°0'0"
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Other Counties
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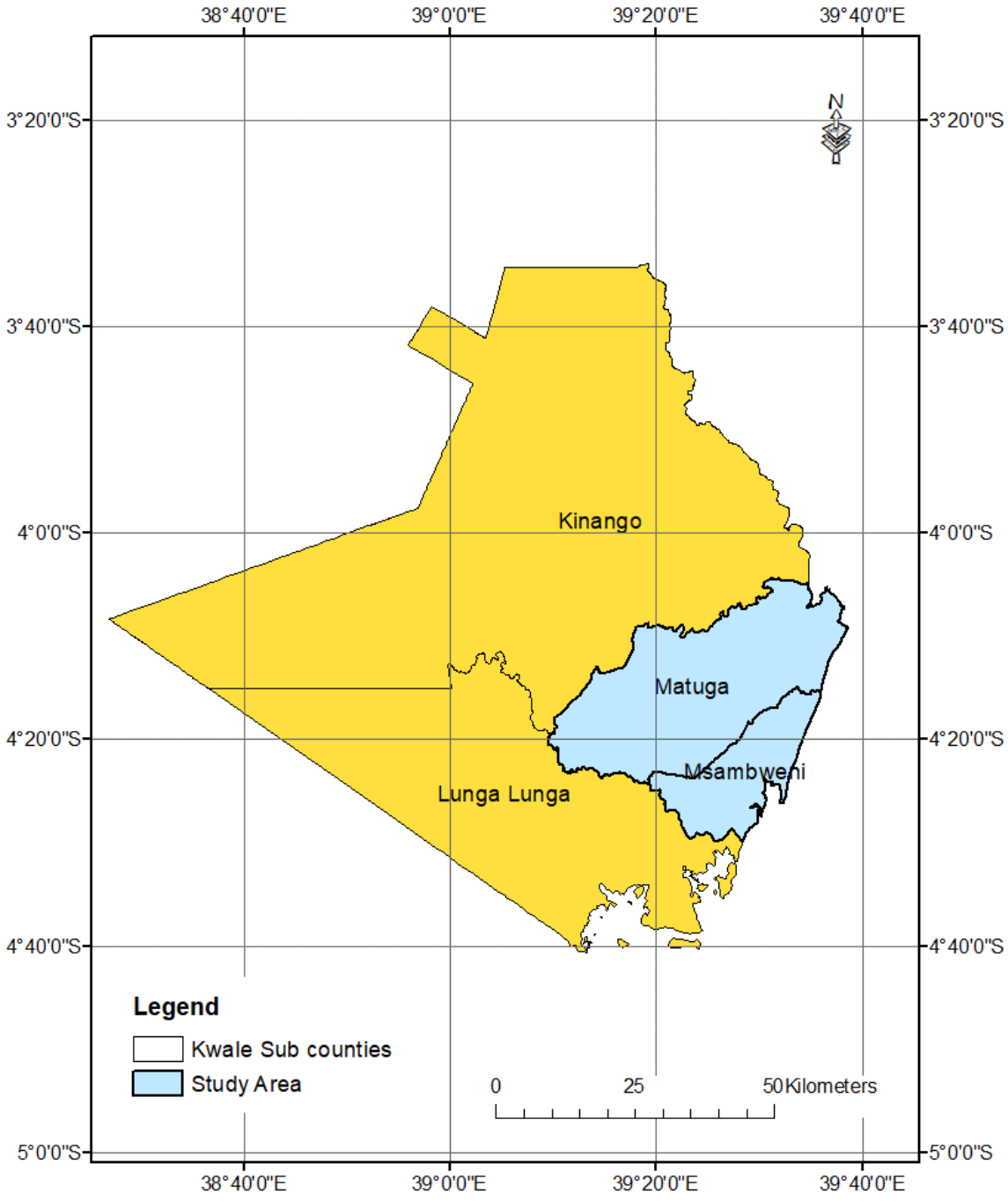
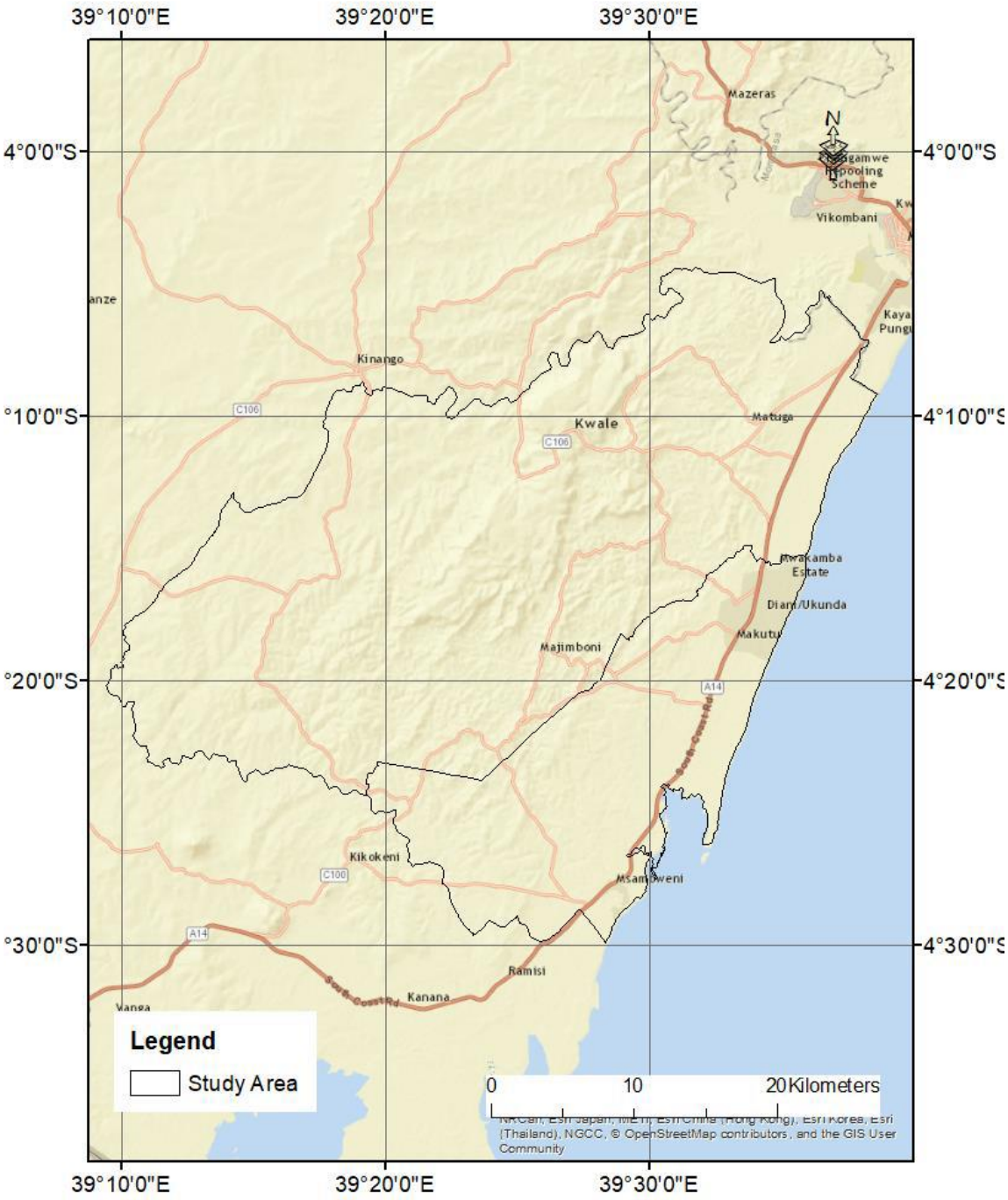
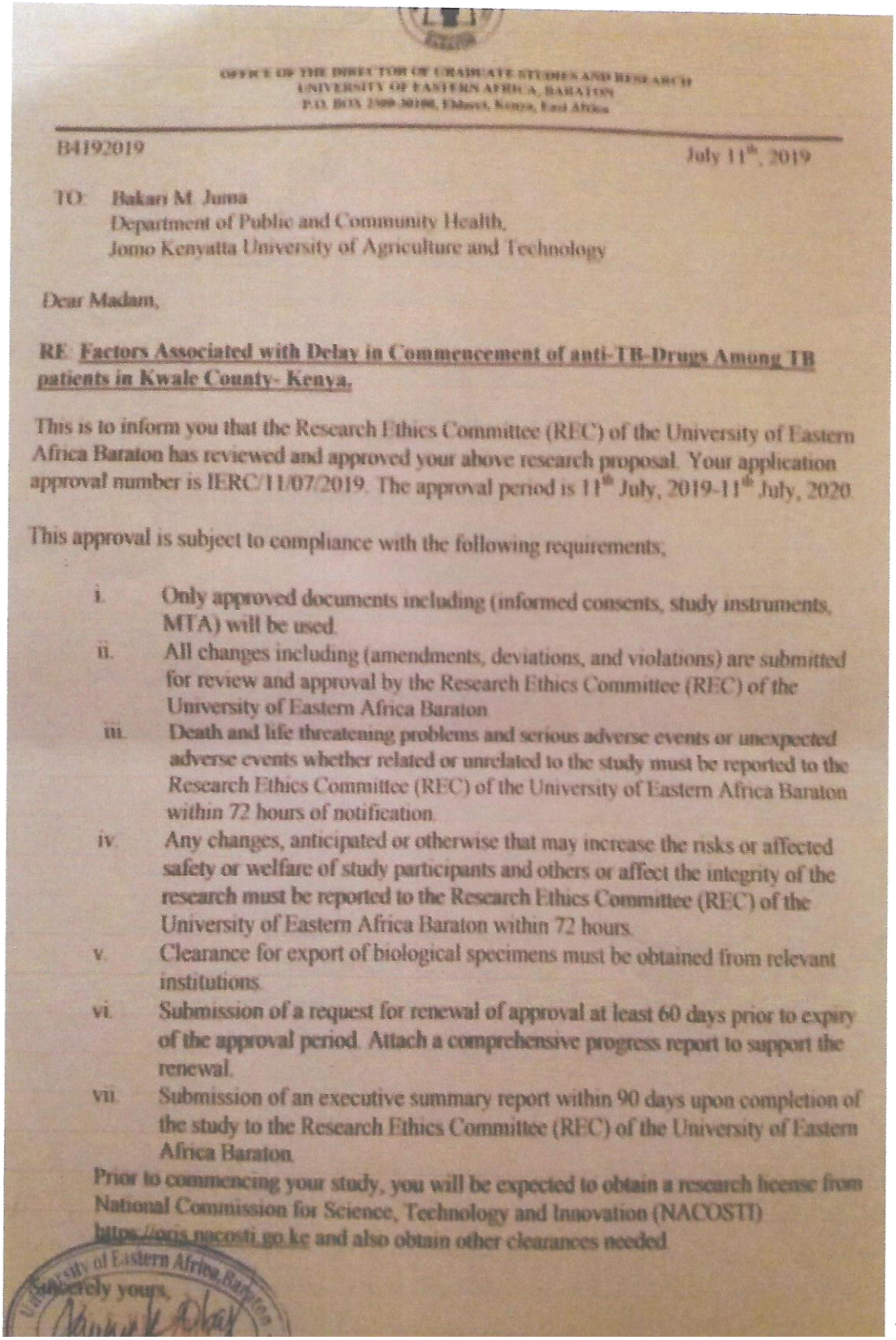
200
400Kilometers


38°40'0"E
39°0'0"E
39°20'0"E
39°40'0"E
3°20'0"S
3°40'0"S
4°0'0"S
4°20'0"S
4°40'0"S
5°0'0"S
N
Kinango
Matuga
Msambweni
Lunga Lunga
Legend
Kwale Sub counties
Study Area
0
25
50 Kilometers


39°10'0"E
39°20'0"E
39°30'0"E
4°0'0"S
4°10'0"S
4°20'0"S
4°30'0"S
Mazeras
Vikombani
Kinango
Kwale
Matuga
Majimboni
Kikokeni
Ramisi
Kanana
Legend
Study Area
0
10
20 Kilometers

Appendix V: Research Approvals



OFFICE OF THE DIRECTOR OF GRADUATE STUDIES AND RESEARCH
UNIVERSITY OF EASTERN AFRICA, BARATON
P.O. BOX 2500-30100, Eldoret, Kenya, East Africa

B4192019 July 11th, 2019

TO: Bakari M. Juma
Department of Public and Community Health,
Jomo Kenyatta University of Agriculture and Technology

Dear Madam,

RE: **Factors Associated with Delay in Commencement of anti-TB-Drugs Among TB patients in Kwale County- Kenya.**

This is to inform you that the Research Ethics Committee (REC) of the University of Eastern Africa Baraton has reviewed and approved your above research proposal. Your application approval number is IERC/11/07/2019. The approval period is 11th July, 2019-11th July, 2020.

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by the Research Ethics Committee (REC) of the University of Eastern Africa Baraton.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to the Research Ethics Committee (REC) of the University of Eastern Africa Baraton within 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to the Research Ethics Committee (REC) of the University of Eastern Africa Baraton within 72 hours.
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to the Research Ethics Committee (REC) of the University of Eastern Africa Baraton.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

University of Eastern Africa, Baraton

Sincerely yours,

Appendix VI: Research Approval by JKUAT

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
OFFICE OF THE DIRECTOR - MOMBASA CAMPUS
P.O Box 81310 – 80100, Mombasa. Tel: +254 735 628 272, 041 2315434 E-mail:director-mombasa@jkuat.ac.ke

22nd July, 2019

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: PERMISSION TO COLLECT DATA BY BAKARI JUMA MWARASI
REG NO: HSH311-C005-6235/2016

The above mentioned is a student at this Campus undertaking MSc. in Public Health course. **BAKARI** is expected to collect data on the topic, '**FACTORS ASSOCIATED WITH DELAY IN THE COMMENCEMENT OF ANTI-TUBERCULOSIS DRUGS AMONG TUBERCULOSIS PATIENTS IN KWALE COUNTY, KENYA.'**

Any assistance given to him will be highly appreciated.

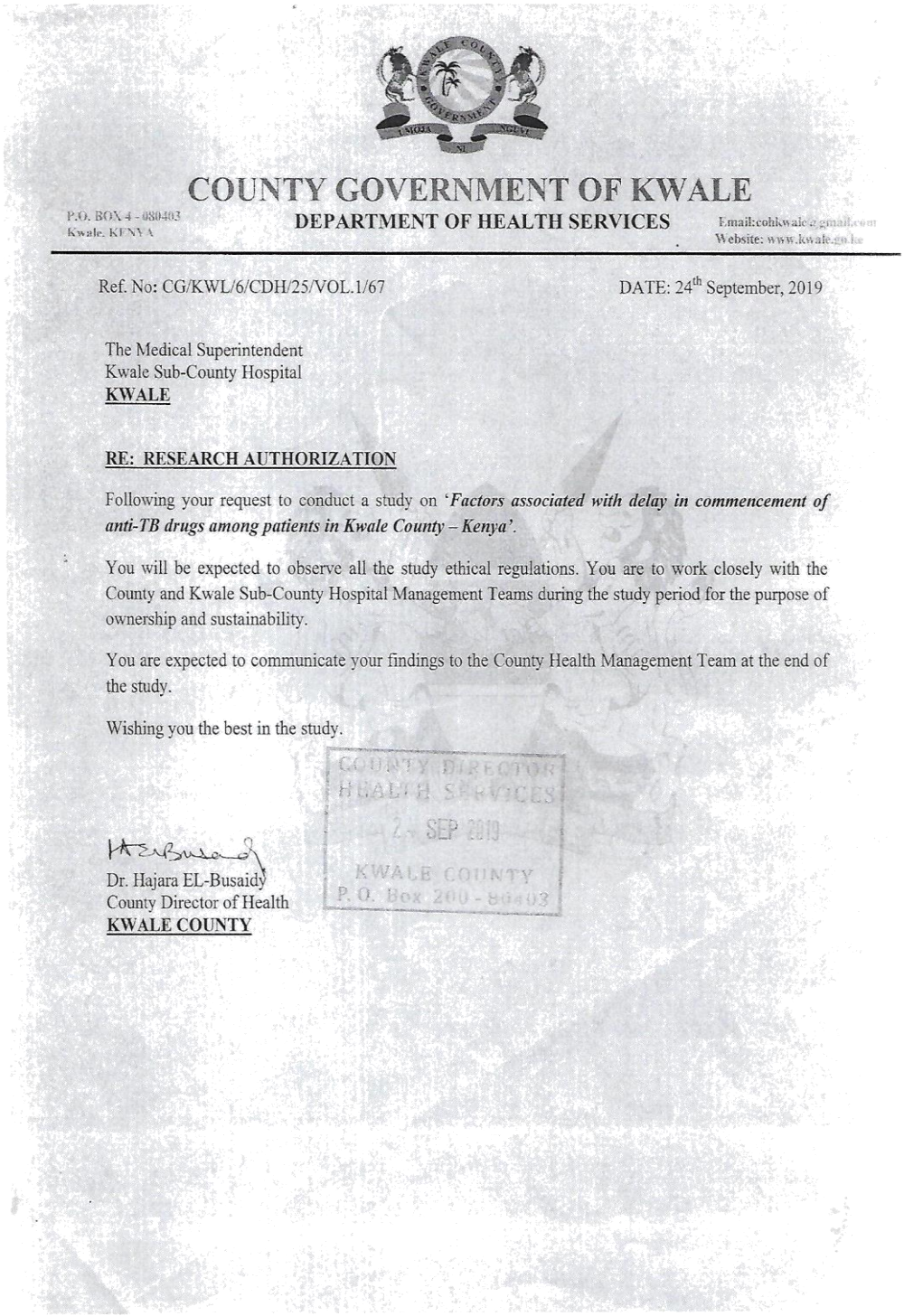
Thank you.

Yours Sincerely,

22 JUL 2019

MS. MARY KERICH
COD. HEALTH SCIENCES

Appendix VII: Research Approval by County Government of Kwale



COUNTY GOVERNMENT OF KWALE

P.O. BOX 4 - 080403
Kwale, KENYA

DEPARTMENT OF HEALTH SERVICES

Email:cohkwale@gmail.com
Website: www.kwale.go.ke

Ref. No: CG/KWL/6/CDH/25/VOL.1/67

DATE: 24th September, 2019

The Medical Superintendent
Kwale Sub-County Hospital
KWALE

RE: RESEARCH AUTHORIZATION

Following your request to conduct a study on '***Factors associated with delay in commencement of anti-TB drugs among patients in Kwale County – Kenya'***.

You will be expected to observe all the study ethical regulations. You are to work closely with the County and Kwale Sub-County Hospital Management Teams during the study period for the purpose of ownership and sustainability.

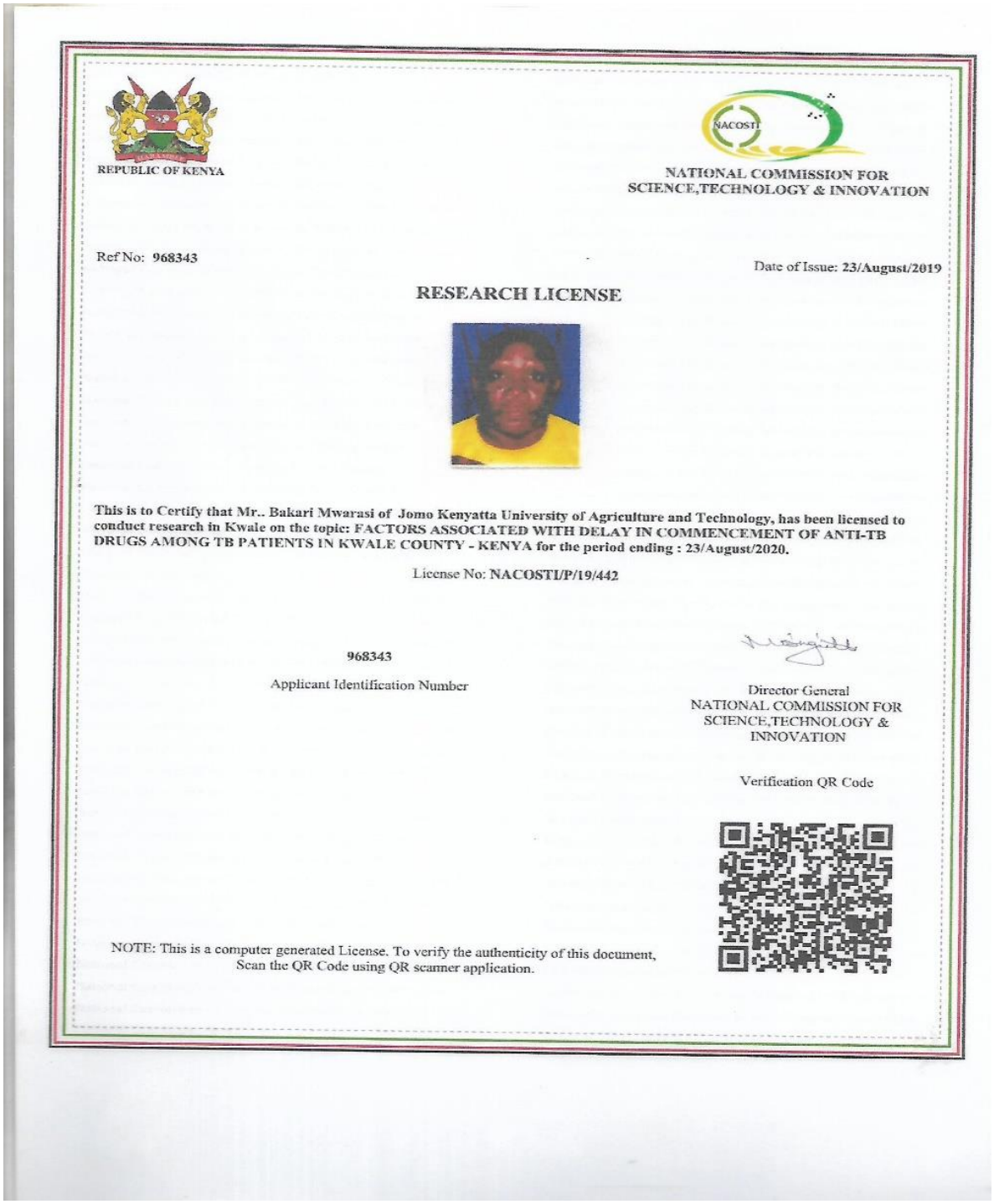
You are expected to communicate your findings to the County Health Management Team at the end of the study.

Wishing you the best in the study.

COUNTY DIRECTOR
HEALTH SERVICES
- 2 SEP 2019
KWALE COUNTY
P. O. Box 200 - 80403

Dr. Hajara EL-Busaidy
County Director of Health
KWALE COUNTY

Appendix VIII: Research Approval by NACOSTI



REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **968343**

Date of Issue: **23/August/2019**

RESEARCH LICENSE

This is to Certify that Mr.. Bakari Mwarasi of Jomo Kenyatta University of Agriculture and Technology, has been licensed to conduct research in Kwale on the topic: FACTORS ASSOCIATED WITH DELAY IN COMMENCEMENT OF ANTI-TB DRUGS AMONG TB PATIENTS IN KWALE COUNTY - KENYA for the period ending : 23/August/2020.

License No: **NACOSTI/P/19/442**

968343

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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