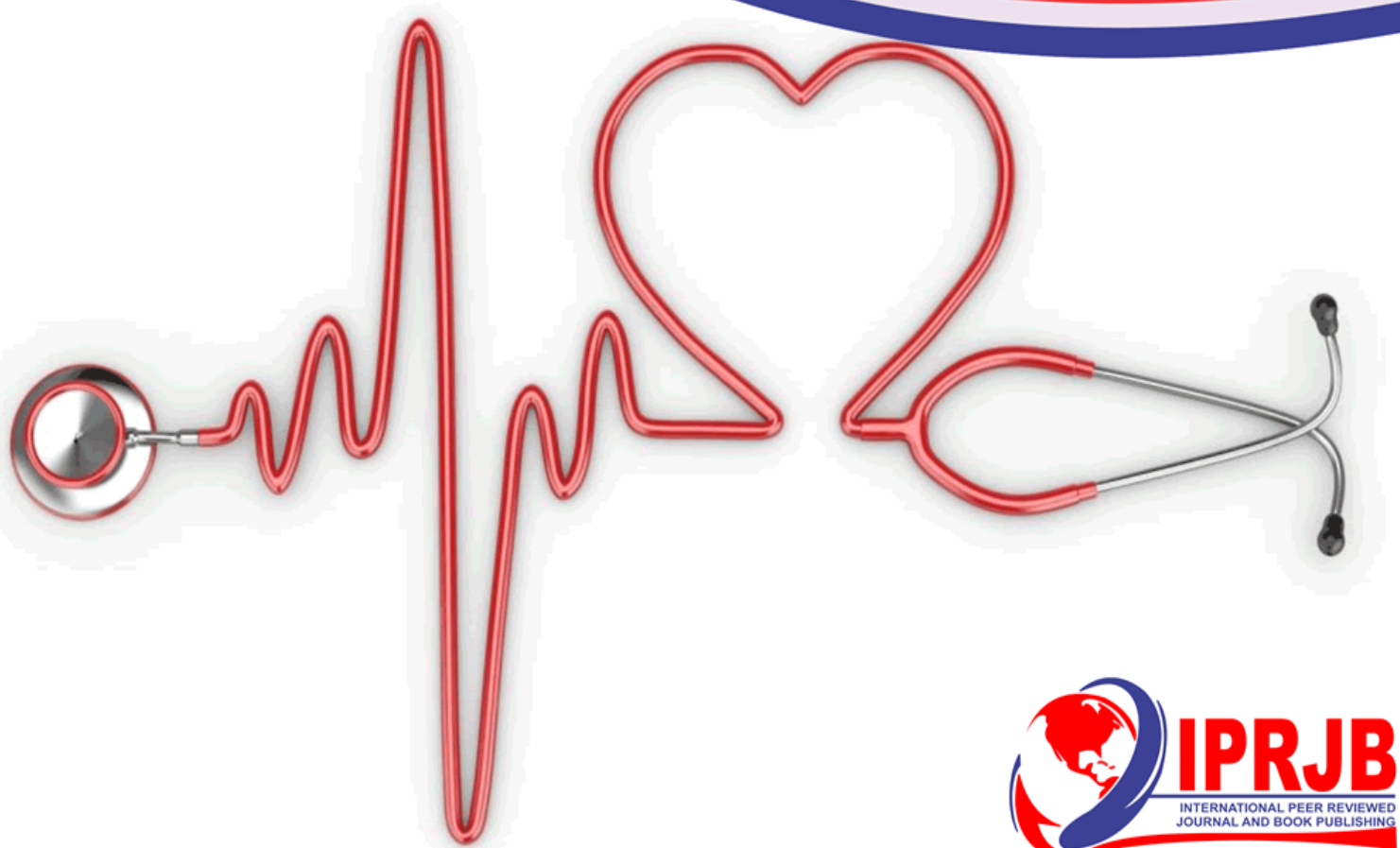


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INFLUENCE OF PATIENT-RELATED FACTORS ASSOCIATED ON TB OUTCOMES AMONG TB PATIENTS IN MOMBASA COUNTY

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Abstract

Purpose: The purpose of the study was to determine patient-related factors associated with TB outcomes among TB patients in Mombasa County.

Methodology: Study was conducted in Mombasa County which is one of the 47 counties in Kenya with an urban population of 1,063,854. The study used a cross-sectional research design. The study population was the total number of notified patients with tuberculosis in one quarter in the study area (Mombasa's health care units) and this was found to be 1207 in the year 2017. It was from this population that a systematic random sample size of 292 patients were interviewed. Quantitative data were analyzed using SPSS version 20 Descriptive statistics frequency (%), mean, and standard deviation were used to express quantitative data. In bivariate analyses, odds ratios (OR) and 95% confidence intervals (CI) for the association between TB treatment outcome and health related factors, institutional factors and patient related factors was done using logistic regression.

Results: The results revealed that patients who are educated about health are more likely to cure of TB than patients who are not (OR 1.716, 95% CI, 0.35 to 1.48). More so, patients who receive psychosocial support are more likely to get cured than those who don't receive psychosocial support (OR 4.08, 95% CI, 2.00 to 8.32). The results of the study give evidence to, therefore, conclude patient related factors are critical to TB treatment outcome.

Unique contribution to theory, policy and practice: Strengthening TB adherence counselling for patients treated for the first time to improve treatment completion. Counselling service should also be enhanced for patients taking alcohol and those smoking cigarettes as both are associated with less likelihood of completing TB treatment. Implementation of TB work place program through sensitization of company managers on the importance of TB treatment support to reduce chances of loss to follow as sighted by focused group discussions. Patients centred TB services should be provided by all facilities by focusing on the needs of the patients by agreeing on the best time to pick drugs to reduce the risk of loss to follow ups.

Keywords: *Patient-related factors, TB outcomes, TB patients.*

1.0 INTRODUCTION

TB is caused by the bacterium *Mycobacterium tuberculosis*, which is an air born disease transmitted from person to person by aerosolized droplet nuclei. It typically affects the lungs (pulmonary tuberculosis) but can affect other sites as well (Varaine and Rich, 2014). The disease is spread in the air when people who are sick with pulmonary TB expel bacteria through coughing, sneezing, laughing or talking (MOPHS, 2009). Relatively small number of people infected with TB will eventually develop the active disease and the probability is much higher among the people living with HIV/AIDS (WHO, 2010).

Tuberculosis is among the top ten causes of death worldwide third among the infectious diseases overtaking even HIV (WHO, 2016). In 2012 8.6 million people developed the disease, 1.3 million died (WHO, 2013). World Health Organization introduced DOTS strategy in 1990 as a cost-effective way to control TB and improve health. Adoption and implementation of this strategy has substantially improved TB control globally. Kenya is one of the few countries in Africa to have achieved the WHO targets of detecting 70% of new TB cases and cure 85% of smear positive TB (WHO, 2014). Kenya is one of the 22 high burdened countries in the world ranked 13th globally and 5th in Africa. Between 2006 and 2010, more than 110,000 cases of TB were notified every year and about 44 per cent of these cases were HIV co-infected. The WHO estimate shows that there are at least 2000 cases of MDR-TB in 2009, of which only 7.5% (150) cases have been identified and notified (WHO, 2011).

Tuberculosis (TB) remains a major cause of morbidity and mortality in Kenya. It affects all age groups but has its greatest toll in the most productive age group of 15 to 45 years Sitienei J, Nyambati V and Bours P (2013). The major factor responsible for the large TB disease burden is the current HIV epidemic. Other factors that have contributed to this large TB disease burden include poverty and social deprivation that has led to mushrooming of peri-urban slums and congestion. Although TB cases notified in the country has stagnated recently, a new challenge of resistant strains of TB is gradually but surely increasing and in particular MDR TB (ministry of public health and sanitation (2010). This new challenge threatens to reverse gains made in the fight against TB in Kenya. Drug Resistant TB (DRTB) is occasioned by development of resistance by the TB bacilli to first line drugs, a result of use improper treatment of patients, poor management of supply and quality of drugs, and airborne transmission of bacteria in public places, Companion handbook WHO (2014). Mombasa is one of the counties with high tuberculosis burden of 425 case notification rate against a national prevalence of 215 (National Leprosy and Lung Disease Program, 2014). More than eighty cases of multidrug resistant TB were diagnosed in the County by end of 2014 (Ministry of health, 2012). A total of twenty-six patients are currently on treatment in County.

1.1 Statement of the problem

Tuberculosis control has three overlapping dimensions; humanitarian, public health and economic. The public health concern emanates from proper diagnosis and treatment of TB patient to decrease disease transmission within community (Arnadottoir, 2009). TB is also responsible for direct or indirect cost to individual and society. The productive adults bear the greatest burden of TB, once infected they are weakened and often unable to work (Laxminarayan, 2007). Tuberculosis remains a major public health problem causing losses in quality of adjusted life years (QALYS) or disability adjusted life-years (DALYS) and it ranks 7th

globally in the global life years lost ranking (Banerjee and Nasaru M, (2014). The failure to eliminate or completely reduce TB as a public health problem has been largely associated with little attention the disease attracts from the government, poor management of TB control programmes, high rates of poverty and population growth especially in urban areas due to migration and HIV/AIDS pandemic. Considerable progress has been made since introduction of DOTS strategy.

The world health assembly passed a resolution to end global TB epidemic with targets to reduce TB death by 95% and cut new cases by 90% between 2015 and 2035 to ensure that no family is burdened with catastrophic expenses due to TB (WHO, 2014). The WHO has recommended adoption of directly observed therapy (DOTS) as strategy to achieve high treatment completion rates in 1990. This is expected to reduce patient's loss to follow up, treatment failures, death and emergence of drug resistance associated with treatment interruptions. Studies have shown that 86-90% of patient receiving complete treatment successfully as compared to self-administered to therapy. Treatment completion and cure rates for Mombasa County have over a long period of time remained low. This is attributable to a number of factors associated with patients, health facility and health care workers.

This project addresses the overall problem associated with patients that hinder treatment completion and also attempt to identify factors that promote TB treatment completions in Mombasa County. The county had the highest TB burden in country with 469 TB cases per 100,000 populations which is higher than the national prevalence of 217/100,000 (NLTLTD, 2013). Eleven percent of patients started on treatment in Mombasa County failed to complete full course of treatment due high rates of loss to follow up, deaths and transfers to other counties reducing treatment completion. One hundred and seventy-six TB patients died in Mombasa County in the year 2012, 6% being children below 15 years of age in addition 49% of the patients who died were co-infected with TB/HIV mainly patients aged between 20-39 years old. Further, two hundred and twenty patients were lost to follow in the year 2012 with 23% of them in Mlao TB control zone. Likoni and Ganjoni contributed 16% and 14% respectively and this was attributed to substance abuse and lack of social support from close family members. One hundred and eighty-seven TB patients were also transferred to other counties across the country and could not be evaluated. Changamwe and Mlaleo TB control zones contributed more than 50% of these cases.

1.2 Justification

Mombasa county had the highest TB case notification rates of 469/100,000 population in the country (NLTLTD, 2013). The treatment completion rates vary according to the various categories of patients with smear positive pulmonary relapse cases having the lowest at 86% and smear not done pulmonary patients having 91%. This is attributable to high loss to follow ups among smear positive retreatment cases (7%), high death rates among smear negative pulmonary cases (5%) and transfer outs among new smear positive patients (4%). Efforts to improve TB treatment completion rates require understanding of factors that influence patient's adherence to TB treatment. Quantitative and qualitative research can contribute to this understanding and promote treatment success rates.

1.3 Purpose of the study

The purpose of the study was to determine patient-related factors associated with TB outcomes among TB patients in Mombasa County.

1.4 Research Questions

The study was guided by the following research question:

- i. What are the patient-related factors associated with TB outcomes?

2.0 LITERATURE REVIEW

2.1 Theoretical Review

The most successful public health programs and initiatives are based on recognizing the health behaviour in the context they occur. As such interventions to improve health behaviour can be designed with an understanding of behaviour change models and the ability to use them skillfully. This study will be anchored by transtheoretical model which is a theory of social behaviour change. The key element in this model is stage of change and proposes that people are at different stages of readiness to adopt healthful behaviour. For successful behaviour change, the model describes the sequence of steps which an individual goes through: Precontemplation, contemplation, preparation, action and maintenance. However, people do not always follow these stages in a linear manner but often repeat certain stages depending on their level of self-efficacy and motivation.

The behaviour of patients and providers have an impact on drug adherence and patient outcomes. Patient's knowledge, attitude, perception and acceptance of TB drug adherence influence their outcome (CDC, 2003). Outcome of TB patients are influenced by types of drug regimen that they are given leading to high pill burden and long duration of treatment, patient factors, relationship between patient and providers and the system of care (Arnadottoir, 2009). Patients may drop out as symptoms subside due to clinical improvement. Geographical proximity to treatment centers, alcoholism and drug addiction may also contribute patient's loss to follow up.

In a systematic review on timing of loss to TB follow up, majority occurred after the intensive phase of treatment (Kruk, May, 2008). A study conducted in Georgia in October 2013 showed that lower household income was found to be significantly associated with poor TB treatment outcome. According to Liew *et al.*, (2015), the commonest predictors of unfavorable outcomes were: old age, male sex, foreign citizenship, lower education, treatment in tertiary setting, smocking, previous anti-TB treatment, HIV infection and patients with extra-pulmonary TB.

2.2 Conceptual Framework

The conceptual framework is adopted from the socio-behavioural model advanced by (Andersen, 1995) and collated from literature review. The model framework looks at the predisposing characteristics, and enabling resources as the major factors for uptake of preconception care. Figure 1 below presents the conceptual framework for the study.



Figure 1: Conceptual framework

Burden of Tuberculosis

Tuberculosis has re-emerged as a major public health problem in the world. Roughly, it is estimated that at least a third of the world population is infected with tubercle bacillus, and around 8 million progress to have active tuberculosis disease each year, while 2 million of those die of the disease. According to WHO reports, incidences of the TB grew by 1% in the year 2003 in the world. This might seem as a low growth rate or long time ago, but recent studies have found the increase of the disease in the 19th century having an effect in 20th century.

Currently, about one-third of the world's population is infected with M. tuberculosis and new infections occur at a rate of one per second. However, most of these infections are asymptomatic and most of them do not cause tuberculosis disease. Tuberculosis is the second most common cause of death after HIV. In 2014, there were an estimated 13.7 million chronic active cases and in 2015 there were 8.8 million new cases and 1.34 million deaths in both developed and developing countries (WHO, 2016). China has achieved great progress, with an 80 percent decline in its TB mortality rate. Although, the distribution of tuberculosis is not uniform across the world, every nation has reported various cases of tuberculosis. In U.S, 10% of the population test positive, while Swaziland was reported to be the country with the highest estimated incidence rate of TB with 1200 cases in every 100,000 people in 2007. In 2010, India had the highest incidence with an estimated 2.0 million new cases. The reported cases in developed countries have always been attributed to the urban environment with almost infinitesimal cases in rural areas.

In Africa, 9 countries have been designated as having high prevalence of TB according to the reports by World Health Organization accounting for 46% of the world's TB cases; Democratic Republic of Congo, South Africa, Kenya, Mozambique, Tanzania, Ethiopia, Nigeria, Zimbabwe and Uganda. The most affected part in Africa is South Africa cutting across East and Central Africa although some of the West African countries also bear the burden of TB while North African Countries are less affected. In Africa, TB burden coincides with HIV/AIDS prevalence and usually serving as a manifestation of the latter. The Millenium Development Goal (MDG) main objective with regard to TB in Africa is to halt and reverse the incidences by 2020. This has seen various developments and campaigns emerging in the last couple of years.

Kenya being among the highly burdened country in the world contribute to the collective 80% of the global TB disease burden. The most devastating attribute is that it has a generalized TB prevalence affecting productive age groups (15-44 years old). Males are 1.4 times more likely to have TB than females. The number of TB cases had increased tenfold from 11,625 in 1990 to 116,723 cases in 2007 to 106,083 in 2010. The average annual increase over the past 10 years was 4% for all forms of TB. In 2012, the total TB cases notified in Kenya were 99,159 cases (MOH and DLTL, 2012).

The major reason for the increasing burden of TB in Kenya is the concurrent HIV epidemic. People Living with HIV/AIDS (PLWHA) are the major subgroup with increased incidence of tuberculosis. The national average co-infection with HIV was 39% in 2011 (MOH and DLTL, 2012). So, TB infection control remains a major programmatic intervention in TB control especially in this era of HIV epidemic and the increasing prevalence of drug resistant TB.

Patient-related factors

According to self-efficacy concept developed by Albert Bandura in 1977, motivation, thinking, feelings, quality of decision making are influenced by the level of self-efficacy. Peoples self-efficacy believes, determine their level of motivation and how much efforts they will exert in achieving their endeavours (TB treatment completion). Belief in curability, severity of the disease, support from family members and health care professional positively influence TB patient's drug adherence (Gebremariam *et al.*, 2010). Age and gender have been linked to treatment adherence in diferent settings (Hudelson,1996). In a longtitudinal study by Fatigegun *et al.*, (2009), the level of knowledge on the TB disease influenced whether or not patient chooses to complete treatment.

Drug resistant tuberculosis, low BMI, adverse drug events were identified as independent prognostic factors for poor outcomes among TB patients in China (Tang, 2013). In a study done in Zambia in 2008 in patients attending tertiary hospital, patients attitude are significantly associated with TB treatment compliance (Mwemba *et al.*, 2008). Knowledge about curability and importance of adherence are strongly associated with high treatment completion as compared with those lost to follow up according to Tachfouti *et al.*, (2012). More than two fifth of TB clients are lost to follow up within the first two months of treatment. This is attributable to ignorance about duration of TB treatment, travelling from treatment sites, improvement in health status and drug adverse effects. Herbal remedies and alcohol was also identified as a factor that hinder TB treatment completion according to Muture *et al.*, (2011).

In a systematic review by Barker *et al.*, (2011), they also established that comobidity with diabetes is associated with increased risk of treatment failure and death during treatment and increased chances of relapses later on in life. A prospective cohort study involving pulmonary TB patients with comordity with diabetes (Jepsen *et al.*, 2012) assessed anthropometry and clinical parameters found that diabetes comordity delayed recovery of body mass and haemoglobin which are important functional recovery indicators. In another retrospective study carried in Maryland among tuberculosis patients with co-morbidity (Dooley *et al.*, 2009) established that diabetes is a major risk factor for death among TB patients and there is a trend toward increased time to culture conversion by two months.

In a retrospective case control study in Singapore there was no significant association of defaulting with age, sex, marital or employment status, disease characteristics, or treatment-related factors and lack of family support were found to be factors strongly predictive of default, Chee *et al.*, (2000). A recent study to assess the risk of loss to follow among previously treated tuberculosis patients in South Africa, established that previously treatment history, male gender and age group of 19-39 years were independently associated with loss to follow up, Marx *et al.*, (2012)

A cohort study done in Spain among co-infected patients revealed that 11% of patients were lost to follow up and this was found to be higher among previously treated patients and 6.6% died, Monge *et al.*, 2014. Unsuccessful treatment was associated with social economic status according to any criteria used, except for the definition of poverty line. Poverty seems to be hampering the achievement of the World Health Organization targeted 90% cure rate in developing settings (Belo, Luiz, Teixeira, Hanson & Trajman, 2011).

3.0 RESEARCH METHODOLOGY

Study was conducted in Mombasa County which is one of the 47 counties in Kenya with an urban population of 1,063,854. The study used a cross-sectional research design. The study population was the total number of notified patients with tuberculosis in one quarter in the study area (Mombasa's health care units) and this was found to be 1207 in the year 2017. It was from this population that a systematic random sample size of 292 patients were interviewed. Quantitative data were analyzed using SPSS version 20 Descriptive statistics frequency (%), mean, and standard deviation were used to express quantitative data. In bivariate analyses, odds ratios (OR) and 95% confidence intervals (CI) for the association between TB treatment outcome and health related factors, institutional factors and patient related factors was done using logistic regression.

4.0 PRESENTATION AND INTERPRETATION OF FINDINGS

4.1 Demographic characteristics of the respondents and TB-Outcome relationship

4.1.1 Gender

The gender of the participants was almost equally balanced. There were 147 male participants and 118 female participants who accounted for 55.5% and 44.5% respectively. However, there was no significant association between gender and TB outcome ($X^2 = 3.174$; df 1 and p -value = 0.075).

4.1.2 Age

The mean age of the participants was 35 (\pm SD 9.8) years with a range of 25 to 55 years. Participants who were below 25 years accounted for 5.7%, while those who 25 to 34% accounted for a higher percentage of 28.3%. Those who indicated age between 35 to 44 years accounted for the highest percentage of 36.9% and those who indicated age between 45 to 55 years accounted for a relatively lower percentage (24.2%) of the participants. Additionally, those who above 55% accounted for 4.9%. There was no significant association between age and the outcome of the TB treatment ($X^2 = 107.057$; df 4 and p -value = 0.055).

4.1.3 Marital Status

Majority of the respondents 192 (72.5%) were married while only 59 (22.3%) were single and only 14 (5.2%) of the respondents were widowed or divorced. Marital status had a significant association with the outcome of the TB treatment ($X^2 = 93.955$; df 2 and p -value = 0.001).

4.1.4 Religion

The study sought to identify the association between religion and TB treatment outcome. 164 (61.9%) of the respondents were Christians while 101 (38.1%) of the respondents were Muslims. None of the study participants indicated Hinduism or any other religion. Additionally, there was a significant association between religion and outcome of the TB treatment ($X^2 = 14.977$; df 1 and p -value = 0.001).

4.1.5 Education

Majority 174 (61.9%) of the respondents had primary education while those who had secondary education were 54(19.2%) of the total respondents. Those who attended college were relatively small compared to those who had secondary education with 32 (11.4%) and only 5 (1.9%)

respondents had no education at all. There was significant association between education and outcome of the TB treatment ($X^2 = 251.84$; df 3 and p-value = 0.001).

4.1.6 Occupation

The distribution of occupation was fair, however, majority 89 (33.6%) of the respondents indicated they were casual labourers, 68 (25.7%) of the respondents indicated that they were salaried employees, 37 (14%) indicated that they did subsistence farming, 35 (13.1%) indicated that they carried fishing, 15 (5.7%) indicated that they practised cash crop farming while 21 (7.9%) indicated that they are self-employed. There was significant association between occupation and outcome of the TB treatment ($X^2 = 92.86$; df 5 and p-value = 0.001). The socio-demographic attributes of the respondents are summarized in the table 1 below.

Table 1: Demographic characteristics summary results

Social characteristics	demographic	Successful	Un-successful	Frequency	Percentage	X ²	df	p-value
Gender								
		132						
Male		(90%)	15 (10%)	147	55.5	3.174	1	0.075
Female		99 (85%)	17 (15%)	118	44.5			
Age								
Mean (SD)				35	(±9.8)			
Median				36	(25-55)			
<25 years		21 (75%)	7 (25%)	28	5.7			
25 – 34 years		86 (89%)	11 (11%)	97	28.3	107.05		
35 – 44 years		82 (87%)	12 (13%)	98	36.9	7	4	0.055
45 – 54 years		19 (100%)	0 (0%)	19	24.2			
55 and above years		25 (93%)	2 (7%)	27	4.9			
Marital Status								
Single		53 (90%)	6 (10%)	59	22.3			
Married		168 (88%)	24 (12%)	192	72.5	93.955	2	0.001
Divorced/Widowed		12 (86%)	2 (14%)	14	5.2			
Religion								
Christian		139 (85%)	25 (15%)	164	61.9	14.977	1	0.001
Muslim		94 (93%)	7 (7%)	101	38.1			
Hindu		0	0	0				
Other		0	0	0				
Education								
None		5(100%)	0	5	1.9			
Primary		145 (83%)	29 (17%)	174	61.9	251.84	3	0.001
Secondary		53 (98%)	1 (2%)	54	19.2			
College		30(93.8%)	2(6.2%)	32	11.4			
Occupation								
Cash crop farming		9(60%)	6(40%)	15	5.7			
subsistence farming		32(86.5%)	5(13.5%)	37	14			
Fishing		33(94.3%)	2(5.7%)	35	13.1	92.849	5	0.001
casual laborer		79 (89%)	10 (11%)	89	33.6			
Salaried employee		59 (87%)	9 (13%)	68	25.7			
Self-employed		21 (100%)	0 (0%)	21	7.9			

No – Number, % - Percentage, X² – Chi square; df – degrees of freedom; p – level of significance; p ≤ 0.05 indicates the relationship is significant.

4.2 Patient level/related factors

Patient related factors which simply are the patient descriptors which translate to be the independent or predictor variables to treatment outcomes. Table 4.4 below shows the summary descriptive as well as the association between the patient related factors and TB treatment outcomes.

Table 2: Patient level related factors

Patient related factors	Successful	Un-successful	Freq uenc y	Percentag e	X ²	df	p- value
Times treated for TB							
One	185 (88%)	26 (12%)	211	79.6			
Two	32 (86%)	5 (14%)	37	14			
More than twice	14 (100%)	0	14	5.3	31.955	12	0.001
Unknown	2(66.7%)	1(33.3%)	3	1.1			
Cigarette Smoke							
Yes	85 (76%)	27 (24%)	112	42.3	44.102	4	0.001
No	148 (97%)	5 (3%)	153	57.7			
Drink Alcohol							
Yes	94 (76%)	29 (24%)	123	46.4	53.46	4	0.001
No	139 (98%)	3 (2%)	142	53.6			
Health Education							
Yes	131 (85%)	24 (15%)	155	58.5			
No	102 (93%)	8 (7%)	110	41.5	10.854	4	0.028
Psychosocial support							
Yes	176 (96%)	8 (4%)	184	69.4	45.982	4	0.001
No	57 (70%)	24 (30%)	81	30.6			
Knowledge of illness							
Yes	222 (91%)	22 (9%)	244	92.1	26.516	4	0.001
No	11 (52%)	10 (48%)	21	7.9			
Side effects							
yes	131 (85%)	24 (15%)	155	58.5	42.577	4	0
No	102 (93%)	8 (7%)	110	41.5			
Stigma							
Yes	129 (88%)	17 (12%)	146	55.1	5.637	4	0.228
No	104 (87%)	15 (13%)	119	44.9			

No – Number, % - Percentage, X² – Chi square; df – degrees of freedom; p – level of significance; p ≤ 0.05 indicates the relationship is significant.

4.2.1 Times treated for TB

Majority 211 (79.6%) of the respondents indicated that they were treated for TB once. A relatively lower number 37 (14%) of the respondents indicated that they were treated for TB twice while 14 (5.3%) of the respondents indicated that they were treated for TB more than twice and 3 (1.1%) indicated unknown times they were treated for TB. The number of times treated for TB had a significant association with TB treatment outcome ($X^2 = 31.955$; $df = 12$ and $p\text{-value} = 0.001$). This is in contrast to a study done by Wohlleben et al. (2017) in Tajikistan where previously treated patients were found to be at high risk of loss to follow up. (OR 2.03, 95% CI 1.05 -3.95).

4.2.2 Cigarette smoking

Majority 57.7% (153) of the respondents indicated that they don't smoke cigarette while a relatively lower number 112 (42.3%) of the respondents indicated that they smoke cigarette. The association between cigarette smoking and outcome of the TB treatment was significant ($X^2 = 44.102$; $df = 4$ and $p\text{-value} = 0.001$).

4.2.3 Drink Alcohol

Majority 53.4% (142) of the respondents indicated that they don't drink alcohol while a relatively lower number 123 (46.4%) of the respondents indicated that they drink alcohol. The association between drinking alcohol and outcome of the TB treatment was significant ($X^2 = 53.46$; $df = 4$ and $p\text{-value} = 0.001$).

4.2.4 Health Education

Majority 58.5% (155) of the respondents indicated that they were educated about health while a relatively lower number 110 (41.5%) of the respondents indicated that they never received health education. The association between health education and outcome of the TB treatment was significant ($X^2 = 10.854$; $df = 4$ and $p\text{-value} = 0.028$).

4.2.5 Psychosocial support

Majority 69.5% (184) of the respondents indicated that they had psychosocial support while a relatively lower number 81 (30.6 %) of the respondents indicated that they don't have psychosocial support. The association between psychosocial support and outcome of the TB treatment was significant ($X^2 = 45.982$; $df = 4$ and $p\text{-value} = 0.001$).

4.2.6 Knowledge of Illness

Majority 92.1% (244) of the respondents indicated that they had knowledge of illness while a low number 21 (79 %) of the respondents indicated that they had no knowledge of illness. The association between knowledge of illness and outcome of the TB treatment was significant ($X^2 = 44.102$; $df = 4$ and $p\text{-value} = 0.001$).

4.2.7 Side effects

Majority 58.5% (155) of the respondents indicated that they experienced side effects while a relatively lower number 110 (41.5%) of the respondents indicated that they don't have side effects. The association between side effects and outcome of the TB treatment was significant ($X^2 = 42.577$; $df = 4$ and $p\text{-value} = 0.001$).

4.2.8 Stigma

Majority 51.1% (146) of the respondents indicated that they experienced stigma while a relatively lower number 119 (44.9%) of the respondents indicated that they don't experience stigma. The association between stigma and outcome of the TB treatment was not significant ($X^2 = 5.637$; $df = 4$ and $p\text{-value} = 0.228$).

4.3 Odds Ratio for Patient related factors

Table 4.7 shows that respondent who are treated more than twice are 1.993 times more likely to get cured of TB compared to those who are treated once (OR-1.993, 95%CI, 0.7 to 5.5). Additionally, respondents who are treated twice are 1.33 times more likely to get cured compared to those who are treated once (OR-1.33, 95% CI, 0.21 to 3.65).

Patients who smoke cigarette are 0.579 times less likely to get cured as compared to those who don't smoke cigarette (OR-0.579, 95% CI, 0.26 to 1.28). Additionally, patients who drink alcohol are 0.307 times less likely to get cured of TB as compared to those who don't drink alcohol (OR-0.307, 95% CI, 0.139 to 0.678). The results also revealed that patients who are educated about health are 1.716 times more likely to cure of TB than patients who are not (OR-1.716, 95% CI, 0.35 to 1.48). More so, patients who receive psychosocial support are 4.08 times more likely to get cured than those who don't receive psychosocial support (OR-4.08, 95% CI, 2.00 to 8.32). Finally, it was revealed that patients who has knowledge of illness are more 1.98 times likely to get cured to those who are not knowledgeable (OR-1.98, 95% CI, 0.17 to 1.47).

Related studies by Dujaili, et al (2010), confirmed a linear relationship between cigarette smoking's with poor treatment outcomes. This study further isolated treatment outcomes with smoking severity. Influence of drinking of alcohol on treatment outcomes was studied by Pelzter and Louwz (2014) in their work that aimed at isolating factors associated with treatment failure and death of patients from TB incidences.

The impact of health education was exhaustively explored and discussed by D Souza (2003) and specifically in the treatment of Pulmonary Tuberculosis. D Souza provides evidence of effect of intensive health education on adherence to treatment which was studied in 60 newly diagnosed pulmonary tuberculosis (TB) patients where their knowledge of TB before and after health education was recorded and their health status during the first three months of the treatment was assessed to measure the effect. His study revealed a statistically significant difference in the total health status scores of patients, after receiving intensive health education between 1st and 30th day, 30th and 60th day, 60th and 90th day, and 1st and 90th day, higher mean post-test knowledge scores, and a highly significant association between sputum conversion and adherence to treatment. Unsuccessful outcome as death, lost-to-follow up, treatment-failure, or not-evaluated and successful outcome as a patient cured or completed-treatment.

Table 3: Odds Ratio results summary for patients related factors

TB Treatment outcome					
Patient related factors	Treatment Outcome		Odds Ratio	CI (95%)	p. value
	Successful	Unsuccessful			
Times Treated					
Twice	86%	14%	1.333	0.21-3.65	0.347
More than twice	100%	0%	1.993	0.7-5.5	0.684
Unknown	67%	33%	0.275	0.24-3.69	0.328
Once	88%	12%	Referent		
Smoke Cigarette					
Yes	76%	24%	0.579 (1.73)	0.26-1.28	0.006
No	97%	3%	referent	referent	referent
Drink Alcohol					
Yes	76%	24%	0.307 (3.26)	0.139-0.678	0.003
No	98%	2%	Referent	referent	referent
Health education					
Yes	85%	15%	1.716	0.35-1.48	0.365
No	93%	7%	Referent	referent	referent
Psychosocial support					
Yes	96%	4%	4.08	2.00-8.32	0.000
No	70%	30%	Referent	referent	referent
Knowledge of illness					
Yes	91%	9%	1.98	0.17-1.47	0.21
No	52%	48%	Referent	referent	referent

Source: Survey 2018

4.3 Outcome of qualitative analysis- Contributor of unsuccessful TB treatment outcome

The qualitative data from Chaani dispensary, Ganjoni dispensary and Bamburi healthcare was grouped into different themes as follows:

Analysis regarding contributors of unsuccessful TB treatment outcome yielded various responses but largely agreed on context. For example, one focus group discussion participants stated:

“Some patients are non-resident of this area and they have come here to visit their relatives and after diagnosis and start of treatment they opt to travel back to their home district and this has led to high number of transfers out and sometimes getting treatment outcomes from patients are difficult as their mobile numbers fail to go through.”

Another participant in the same group contributed on the same but touched on the psychological support. He said that:

“In other instances, the family members no longer support the patients and because of prolonged duration of TB treatment some patients just give up and completely lost to follow up. Sometimes

they change their residence without informing the facility, this mostly occurs to those casual workers who move from industry to another looking for job”

Additionally, a different perspective and opinion was noted regarding the work time and occupation. The participant noted that:

“Patients who work in EPZ are required to be at work place very early before 8.00 am and the facility usually opens at 8.30, this has also contributed to some loss to follow up and self-transfers.”

A FGD in Bamburi healthcare reported different views. One participant said that drug abuse is a common contributor:

“Drug abuse is rampant among patients and most of them come for treatment late when they can no longer perform their daily activities. Drug adherence among this population is very poor as most loss to follow up are from this category of patients. Sometimes this will lead to death. The TB/HIV co-infection rate is also high among drug addicts. They also have a habit of changing dens as they engage in theft and when police men are searching for them, they move and change their dens and end up being lost to follow at the point of TB care.”

Similar views were almost echoed by focus group from Ganjoni dispensary. One of the participants said that:

“Some of our clients with unsuccessful treatment outcomes are street families who lack the basic necessities including shelter and where to keep their medicines, they keep on changing sites of residence and this had led to loss to follow up. Substance abuse among this population is also common and this has led side effects like vomiting and abdominal pains and among few cases has led to death and loss to follow up due to poor drug adherence. They food which is crucial for TB treatment as the disease is debilitating when left untreated, they don’t have a place to prepare food supplements provided at the nutritional clinic in case therapeutic foods are in short supply which happens most of the time. They come late most of the time and occasionally skip drugs.”

A FGD participant from Chaani dispensary noted that lack of follow up is the main issue which causes failure in treatment. She said that:

“Majority of patients who are lost to follow up reported the reason for interrupting treatment as feeling better and seeing no need to continue with the treatment. Patients who reside in the slum districts contribute the largest proportion, matatu touts and patients who inject drugs including others using other substances also interrupt treatment. Some patients live alone and therefore don’t even have treatment supporters to encourage them to continue taking the medicines.”

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of the findings

Patient related factors

The results give evidence that among the patient related factors, cigarette smoking, drinking alcohol, access to health education, prior presence of chronic illness, psychological support and distance to health facilities had significant association with the TB treatment outcome. These results provide empirical evidence on the critical issues that resources can be directed to in order

to improve TB burden in the County of Mombasa. This was supported by odds ratio results which revealed that patients who smoke cigarette are less likely to get cured as compared to those who don't smoke cigarette (OR 0.579, 95% CI, 0.26 to 1.28). Additionally, patients who drink alcohol are less likely to get cured of TB as compared to those who don't drink alcohol (OR 0.307, 95% CI, 0.139 to 0.678). The results also revealed that patients who are educated about health are more likely to cure of TB than patients who are not (OR 1.716, 95% CI, 0.35 to 1.48). More so, patients who receive psychosocial support are more likely to get cured than those who don't receive psychosocial support (OR 4.08, 95% CI, 2.00 to 8.32).

5.2 Conclusion

Based on the findings of the study, the study therefore, conclude that Patient related factors are significant factors that influence the outcomes of TB among TB patients in Mombasa County. Specifically, among the patient related factors, times treated for TB, cigarette smoking, drink alcohol, health education, psychosocial support, knowledge of illness, side effects and stigma were concluded to be the factors that affect TB outcomes among TB patients. That is, the less the patient smokes cigarette, drinks alcohol the more the patient outcomes are likely to be improved. In addition, patients who are treated more often, and those who are enlightened about their health are more likely to recover from TB. Therefore, it is worth noting that the patient needs to be aware of the patient related factors in order to minimize the risk that are associated with them.

5.3 Recommendations and Contributions of the Study

Strengthening TB adherence counselling for patients treated for the first time to improve treatment completion. Counselling service should also be enhanced for patients taking alcohol and those smoking cigarettes as both are associated with less likelihood of completing TB treatment. Implementation of TB work place program through sensitization of company managers on the importance of TB treatment support to reduce chances of loss to follow as sighted by focused group discussions. Patients centred TB services should be provided by all facilities by focusing on the needs of the patients by agreeing on the best time to pick drugs to reduce the risk of loss to follow ups.

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