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Original Research Article

Determinants of health-seeking behaviours leading to total delay in tuberculosis treatment among adult patients in Kirinyaga County, Kenya

Milkah W. Wambui*, John P. Oyore, Harun M. Kimani

Department of Family Medicine, Community Health and Epidemiology, Kenyatta University, Nairobi, Kenya

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***Correspondence:**
Dr. Milkah W. Wambui,
E-mail: Milkawanjiru001@gmail.com

ABSTRACT

Background: Total delay in tuberculosis (TB) treatment is a great challenge in public health, where it leads to more cases of morbidity and mortality. The study aimed to identify the determinants of health-seeking behaviors that lead to total delay in TB treatment.
Methods: Employed a mixed-method approach where qualitative and quantitative data were collected. Multistage sampling methods to identify the respondents.
Results: The findings revealed that the prevalence of total delay in TB treatment was 60.6%. 47% of the patients sought treatment after months of illness. 68% of patients committed to delay in seeking care due to lack of TB knowledge. 58% were diagnosed with TB on their first visit while 42% visited the health facility more than once before diagnosis. The patients experience the three levels of total delay; short delay (27%), moderate delay (28%), and long level (45%). Individual factors such as level of education, employment status, and comorbidities status were found to be associated with a total delay at a p value of 0.0028, 0.012, and <0.00, respectively.
Conclusions: The level of TB total delay was long among the patients where there was a delay in seeking care, diagnosis, and treatment. Factors such as level of education, employment status, and comorbidity status were found to be associated with health-seeking behaviors leading to total delay. Recommendations include; implementing TB programs, strengthening and promoting health education, health awareness campaigns, and prompt diagnosis and treatment of TB. Further research is necessary for additional factors and to assess intervention effectiveness.

Keywords: Anti-TB treatment, Health-seeking behaviors, Patient delay, Pulmonary TB, Tuberculosis

INTRODUCTION

Globally and nationally, TB continues to be a major public health problem, and its burden continues to increase. Tuberculosis is an infectious disease caused by the bacillus *Mycobacterium tuberculosis*, which typically affects the lungs, but can also affect other parts of the body.[1] High TB prevalence can be due to poor health-seeking behaviors that lead to total delay in TB treatment. Health-seeking behaviors are the individuals' actions or inactions that enable them to cope or deal with their disease symptoms.[2] TB total delay is defined as the period from the onset of key symptoms of TB to the initiation of anti-TB treatment.[3] A duration of more than three weeks between the TB's symptoms onset to the time of initiation of TB treatment can be termed a total delay in TB treatment.[4] Total delay includes three levels; short total delay, moderate total delay, and long total delay. A short total delay includes a duration of fewer than 21 days (3 weeks), a moderate total delay includes a duration of 4 weeks to 10 weeks, and a long total delay of above 11 weeks.[4,5] Despite that TB is treatable and the success of DOTs, the disease has continued to have massive mortality and devastating morbidity rate.[6] According to

WHO (2017), around 10 million people get infected with TB annually, and it is ranked as one of the top ten causes of death globally.[7] WHO 2020 reported that TB disease claims about 4000 people daily.[8] According to WHO's global TB report (2015), 8.6 million individuals develop TB, but fewer than 6 million cases are reported and treated.[9] In 2019, there was still a large gap of 2.9 million people between the newly diagnosed and the 10 million estimated TB cases which was a result of underdiagnoses and underreporting of people who were diagnosed.[8] Without prompt treatment, WHO in 2014 reported that 50 percent of TB patients die within 5 years and in one year, the patient who is the source of TB infection infects about 10 to 15 people if not treated.[10] Factors such as lack of knowledge on TB and awareness, level of education, employment status, age, and sex were found to affect the patients' care-seeking behaviors which resulted in prolonged duration before appropriate treatment.[11,12]

MOH in 2017 reported that nearly 50% of TB cases remain not diagnosed and treated in Kenya which consequently leads to an increase in transmission hence morbidity and mortality.[7] Although TB diagnosis, medicines, and nutritional support are offered freely in all government health facilities, 40% of TB cases are missed annually.[13] National TB prevalence survey 2016 reported that TB cases are higher in Kenya with a prevalence of 558 per 100,000.[7] From Kenya's tuberculosis prevalence report per county, Kirinyaga County ranked 10th with a prevalence of 263 per 100,000 people.[14] From DHIS, TB is among the 20 leading diseases in Kirinyaga County and the second notifiable disease.[15] Appropriate TB treatment can avert more than 60 million deaths if a million patients can access diagnosis and care early.[8]

METHODS

Study design

The study employed a descriptive cross-sectional study design to assess the individual factors of health-seeking behaviors that are associated with TB total delay among adult patients in Kirinyaga County with pulmonary TB. Both quantitative and qualitative data were collected.

Study setting

The study was conducted in Kirinyaga County. The county is located between the latitudes 0°1" and 0°40" south and the longitudes 37° and 38° east. It lies between 1,158 meters and 5,380 meters above sea level in the South of Mount Kenya. It covers an area of 1,478.1 km^2. and in the 2019 census, it had a population of 610,411 people. The study was carried out in five sub-counties of Kirinyaga County. Kirinyaga County consists of five sub-counties named; Kirinyaga East, Kirinyaga Central, Kirinyaga West, Mwea West/Kirinyaga North, and Mwea East/Kirinyaga South.

The study was conducted in fifteen public health facilities with public health TB clinics of which three were from each sub-county. In Kirinyaga West Sub County, the study was carried out at Kianyaga Sub-County Hospital (SCH), Kabare Health Center (HC), and Kiamutugu HC. In Kirinyaga Central Sub-County, the study was carried out in Kerugoya County Referral Hospital (CH), Kagumo HC, and Ucheru HC. In Kirinyaga West Sub County, the study was carried out in Sagana SCH, Baricho HC, and Kang'aru HC. In Mwea West/Kirinyaga North Sub County, the study was carried out in Thiba HC, Mutithi HC, and Rukanga HC. Finally, in Mwea East Kirinyaga South Sub County, the study was carried out in Kimbimbi SCH, Difathas HC, and Kutus HC.

Study population

The study included adult TB patients in the intensive phase and the newly diagnosed during the study period of age from 18 years to 70 years with pulmonary TB.

Sample size and sampling techniques

The study employed multistage sampling methods to ensure sample representation. The county was purposively selected based on a population of TB patients. Three health facilities per sub-county were considered adequate to provide the minimum required sample of 267. Finally, TB patients were selected using comprehensive sampling where all the eligible TB patients who attended the clinics within the study period were interviewed. The sample size was computed using the Taro Yamane Formula (Yamane, 1973) $n= N/[1+N(e)]^2$ which gave us a sample size of 246. The inclusion criteria included those who gave consent to participate in the study, and adult TB patients undergoing treatment in public health facilities TB control program. The study excluded those who did not give consent, critically sick patients, mentally ill patients, and patients above 70 years of age.

Data collection and variable measurement

The study was conducted between 18th November 2019 and 31st January 2022, using questionnaire forms configured in ODK collect application on Android phones of research assistants. The study deployed the Kobo Toolbox server to receive the data upon submission. The questionnaire obtained quantitative data and qualitative data by use of both open and closed questions and was administered to the participants. The acquired data was also obtained by administering interview schedules with focused group discussion and key informant interviews.

Data analysis

The data analysis began in August 2022 using the STATA version 15.0 computer software program.

Data from the Kobo Toolbox server was extracted to Excel for cleaning and analysis. Quantitative data was analyzed using STATA version 15.0 where descriptive findings were displayed using tables in the form of frequencies and percentages. The total delay in TB treatment was computed by converting the variables illustrating delay in seeking care, diagnosis, and treatment into binary variables. These variables had their dimension reduced using principle component analysis (PCA) to generate the outcome variable (total delay in TB treatment). Inferential analysis was done using Chi-square tests of association, bivariate, and multivariate logistic regressions of 95% confidence interval. The level of significance was set at $p<0.05$ with any p value less than the 0.05 level being considered significant. Data from the open-ended questions was summarized into frequencies and percentages and then expressed using graphs. Qualitative data from FGDs and KII was recorded and the common views were noted, coded and organized according to the objectives' themes.

RESULTS

Sociodemographic characteristics

A total of 246 respondents aged 18-70 years were interviewed. From the findings, a majority of the respondents were of age 35-44 at 31% followed by those aged 25-34 at 20%, and male TB patients were a majority at 80%. Over half of the patients came from households of size 1-3 (57%) followed by 38% from households of sizes 4-6. A few (5%) patients were members of households with more than 7 members (Table 2).

Socio-economic characteristics

Slightly more than half of the population (55%) were self-employed followed by 22% who were employed. About 18% of the patients were unemployed while 5% were students. Regarding education level, about half (51%) had only attended school up to the primary level followed by 33% who had attained secondary education. This leaves about 15% of the patients spread between tertiary education (9.7%) and 6% with no formal education (Table 2).

Co-morbidities status

About 85.4% of the participants were not suffering from other illnesses apart from TB. However, 14.5% of them were suffering from other illnesses (Table 2).

Among those who were suffering from other illnesses, the majority of them had HIV/AIDS at 61%. About 22% were suffering from hypertension, 11% from diabetes, and 5.6% from other illnesses such as arthritis and cancer (Figure 1).

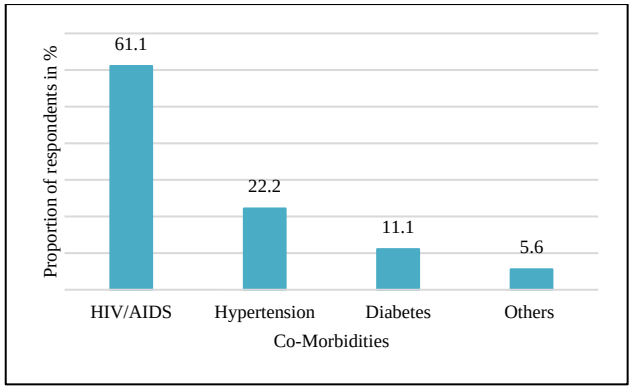

Figure 1: Co-morbidity status.

Table 1: Total delay in TB treatment (n=246).

Time from onset of symptoms to treatment (levels of delay)	N	%
Short delay; days (1-21 days)	66	26.8
Moderate delay; weeks (4-10 weeks)	70	28.5
Long delay; months (>11 weeks)	110	44.7
Total	246	100
Presence of TB total delay		
Yes	149	60.6
No	97	39.4
Total	246	100

Delay categorization as recommended by Maior et al and Dantas et al.[4,5]

Access to health facilities

Almost 80% of the respondents reside within a 5 km radius of a health facility (1 km and 59% between 1 to 5 km). However, 5% of them have to cover distances of more than 10 km to access health facilities. 67% take less than 30 minutes to access a health facility while about 2% take more than an hour to reach a facility. Less than a third of the respondents do not spend a shilling to reach the health facility (28%) while about 5% spend more than KES. 200 and about a third (32%) spend between KES.100 to KSh. 200 (Table 2).

Knowledge on tuberculosis

About 38% of the patients thought that the disease was not preventable. Despite the patients being on medication, 11% did not know as to whether TB is curable. A majority of the patients perceived the disease to be serious (89%) (Table 2). 82% of the patients were aware that TB disease develops from an infection. However, 18% did not know what causes TB (Figure 2).

Regarding TB transmission, slightly more than half of the patients were aware of TB being airborne at 66.5%. However, over a third of the respondents (33.5%) were not aware of the modes of transmission (Figure 2).

Table 2: Association between individual factors and TB total delay.

Variable	TB total delay	No TB total delay	Total (%)	P value
	N (%) (n=149)	N (%) (n=97)	N (%) (n=246)	
Age category				
15-24	23 (15.44)	13 (13.40)	36 (14.63)	0.399
25-34	34 (22.82)	16 (16.49)	50 (20.33)	
35-44	48 (32.21)	28 (28.87)	76 (30.89)	
45-54	18 (12.08)	21 (21.65)	39 (15.85)	
55-64	16 (10.74)	11 (11.34)	27 (10.98)	
65 and above	10 (6.71)	8 (8.25)	18 (7.32)	
Education level				
College/University	18 (12.08)	6 (6.19)	24 (9.76)	0.028*
Secondary school	56 (37.58)	25 (25.77)	81 (32.93)	
Primary school	65 (43.62)	61 (62.89)	126 (51.22)	
No formal education	10 (6.71)	5 (5.15)	15 (6.1)	
Sex				
Female	33 (22.15)	16 (16.49)	49 (19.92)	0.278
Male	116 (77.85)	81 (83.51)	197 (80.08)	
Household size				
1-3	78 (52.35)	61 (62.89)	139 (56.50)	0.259
4-6	62 (41.61)	32 (32.99)	94 (38.21)	
7 and above	9 (6.04)	4 (4.12)	13 (5.28)	
Occupation status				
Employed	35 (23.49)	20 (20.62)	55 (22.36)	0.012*
Self-employed	90 (60.40)	46 (47.42)	136 (55.28)	
Student	7 (4.70)	4 (4.12)	11 (4.47)	
Unemployed	17 (11.41)	27 (27.84)	44 (17.89)	
Comorbidities				
Yes	138 (92.62)	72 (74.23)	210 (85.37)	<0.001*
No	11 (7.38)	25 (25.77)	36 (14.63)	
Distance to facility				
Less than 1 km	32 (21.48)	20 (20.62)	52 (21.14)	0.757
1-5 km	86 (57.72)	59 (60.82)	145 (58.94)	
6-10 km	22 (14.77)	15 (15.46)	37 (15.04)	
More than 10 km	9 (6.04)	3 (3.09)	12 (4.88	
Time taken to reach facility				
Less than 30 minutes	99 (66.44)	65 (67.01)	164 (66.67)	0.926
30minutes and above	50 (33.56)	32 (32.99)	82 (33.33)	
Cost of transportation to facility				
Nothing	41 (27.52)	27 (27.84)	68 (27.64)	0.135
Less than 100 KSh	45 (30.20)	41 (42.27)	86 (34.96)	
Between 100-200 KSh	52 (34.90)	27 (27.84)	78 (31.71)	
More than 200 KSh	11 (7.38)	3 (3.09)	14 (5.69)	
TB can be prevented				
Yes	91 (61.07)	61 (62.89)	152 (71.79)	0.775
No	58 (38.93)	36 (37.11)	94 (38.21)	
TB is curable				
Yes	131 (87.92)	87 (89.69)	218 (88.62)	0.892
No	3 (2.01)	2 (2.06)	5 (2.03)	
I don't Know	15 (10.07)	8 (8.25)	23 (9.35)	
Is TB disease serious				
Yes	134 (89.93)	91 (93.81)	225 (91.46)	0.287
No	15 (10.07)	6 (6.19)	21 (8.54)	

*Statistically significant.

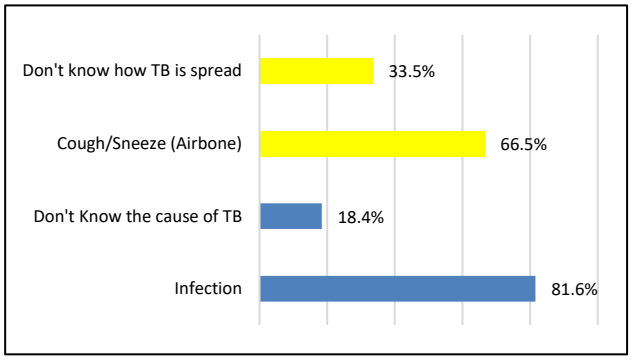

Figure 2: Perceived modes of transmission and causes of TB.

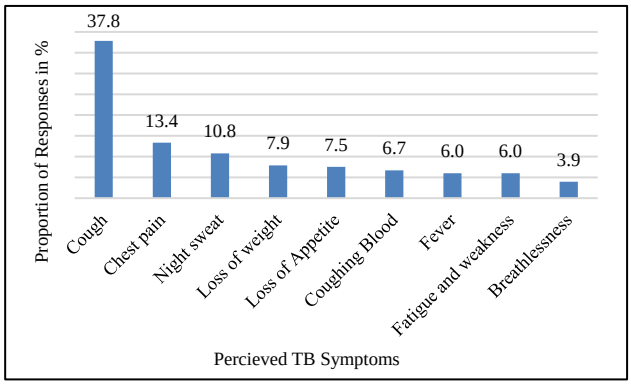

Figure 3: Patients' knowledge of tuberculosis symptoms.

The most commonly known TB symptoms among TB patients were cough (38%); chest pain (13.4%) and night sweat (10.8%) (Figure 3).

Total delay in TB treatment

To explore the TB total delay in TB, descriptive analysis was conducted to assess the three types of delay in TB treatment: delay in seeking treatment, delay in diagnosis, and delay in beginning treatment.

The results from PCA illustrated a prevalence of 60.6% (95% CI =53.88% to 66.11%) of total delay in TB treatment among patients in Kirinyaga County (Table 1).

Delay in seeking care

Almost half (47%) of the patients sought treatment after months of illness. Only about a quarter of the patients sought care promptly within days of the onset of symptoms (Figure 4).

A majority of the patients committed to delay in seeking care due to the lack of knowledge on TB (68.4%). 16.5% inadequate time to access the facility either due to distance or financial constraints. Fear of diagnosis contributed 6.3% delay in seeking treatment possibly due to social stigma (Figure 5).

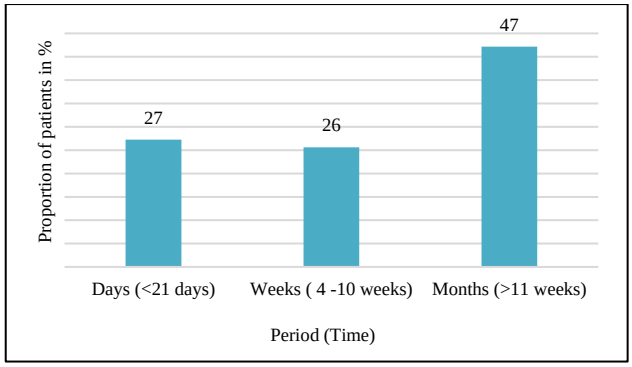

Figure 4: Time taken before seeking care

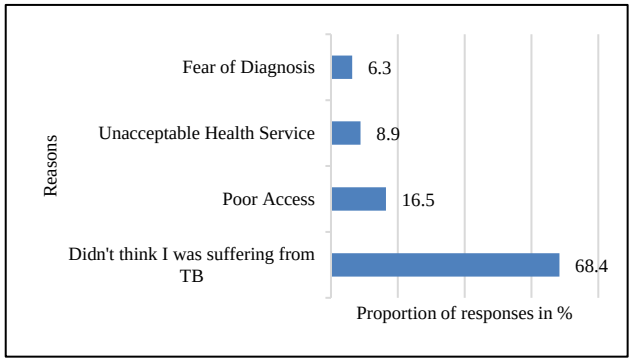

Figure 5: Reason behind delay in seeking care.

Delay in diagnosis

Despite seeking care, slightly more than half (58%) of the patients were diagnosed with TB on their first visit to the health facility. Critical to note, that the remaining 42% made more than one visit before being diagnosed with TB. Thus, 42% were not promptly suspected to have TB and were wrongly treated for other illnesses hence the delay (Figure 6).

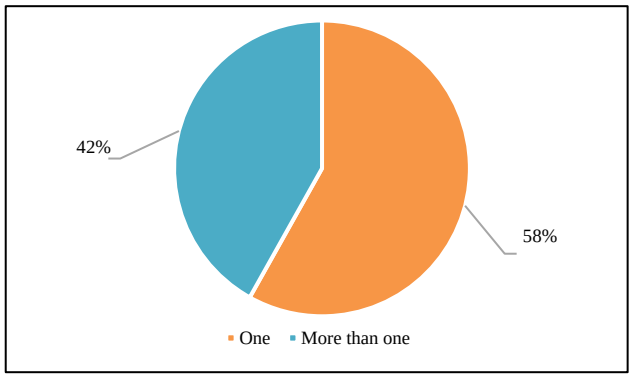

Figure 6: Number of visits before tuberculosis diagnosis.

Delay in treatment

Upon receiving treatment, the majority (68%) of the patients began their anti-TB treatment within a day of receiving results. However, a third of the patients (32%)

experienced treatment delay. Critical to note, that some patients reported that they began treatment weeks (4%) and months (3%) after receiving their diagnosis illustrating a critical gap in TB treatment (Figure 7).

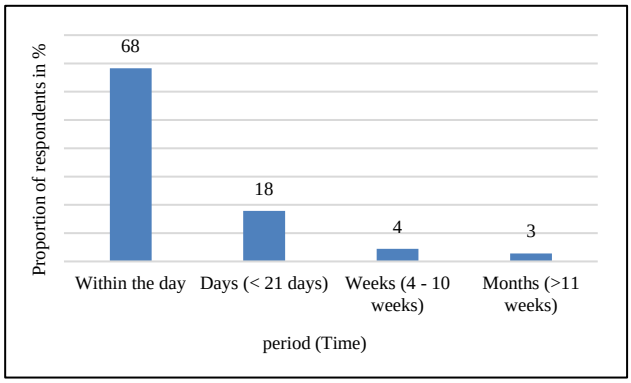

Figure 7: Treatment delay.

Levels of patient's TB total delay

Only 27% had experienced short total delays (acceptable delay), 28% had experienced moderate total delays and 45% had experienced long total delays. Almost half of the patients experience long total delays which is unacceptable due to the nature of the infectious disease (Table 1).

Associated between individual factors and TB total delay

The chi-square test of association was conducted at a 95% confidence interval to assess the association between the respondents' individual-level factors and TB total delay. Among the individual factors, the patient's education level and occupation status illustrated a significant association with TB total treatment delay (p=0.028) and (p=0.012) respectively. Additionally, the variable on comorbidities illustrated a significant association with total delay in treatment delay (p<0.001) (Table 2).

A multivariate binary logistic regression analysis was conducted to illustrate the direction and magnitude of the independent variables on the total delay in TB treatment. Critical to note, patients who had primary education level as their highest education level were 49% (AOR: 0.514 (95% CI 0.278-0.952, p=0.034) less likely to experience total delay in TB treatment compared to those who had achieved secondary school education. Additionally, among the individual factors, patients with comorbidities were 73% less likely to experience total delay in TB treatment compared to those who had no comorbidities (AOR: 0.267 (95% CI 0.120-0.594, p=0.001) (Table 3).

Table 3: Multivariate logistic regression of individual factors against total tuberculosis treatment delay.

Variables	Adjusted odds ratio (95% CI)	P value
Education level		
College/university	1.508 (0.475-4.786)	0.700
Secondary school	Ref	
Primary school	0.514 (0.278-0.952)	0.034*
No formal education	1.177 (0.334-4.138)	0.800
Employment Status		
Employed	Ref	
Self-Employed	1.119 (0.566-2.211)	0.747
Student	0.537 (0.120-2.391)	0.414
Unemployed	0.425 (0.178-1.015)	0.054
Comorbidities		
Yes	0.267 (0.120-0.594)	0.001*
No	Ref	

*Statistically significant.

DISCUSSION

The study assessed the association between individual factors of health-seeking behaviors that lead to TB total delay among adult TB patients in Kirinyaga County. The findings illustrated the presence of TB total delay in Kirinyaga County. Nearly half of the respondents took months from the onset of TB symptoms to the time they sought healthcare. According to the 2021 TB guidelines, patients should seek TB treatment with coughs of any duration.[16] A similar finding in Northwest Ethiopia was reported by Asres et al in 2017 where 53.4% of the study participants delayed in seeking TB health care services.[17]

Similarly, 42% of respondents experienced a delay in TB diagnosis hence continuing the spread of the bacteria which is a critical gap in TB diagnosis. A study done in China by Jiang et al in 2022 found almost similar results where 59% of TB patients had delayed TB diagnosis.[18] The study also found that 68% of patients started the TB treatment on the same day of diagnosis, while 32% didn't start the treatment the same which is inappropriate

according to the 2012 TB guidelines.[16] The TB guidelines by the Division of National Tuberculosis in 2021 state that any confirmed cases should start treatment immediately.[16] Taking this in consideration, any single delay in treatment means new transmissions of the disease.[10] The study established that the major reasons for delay in TB according to the respondents were fear of the diagnosis, poor health services, poor access to health care services, and lack of TB knowledge.

This study established that the level of total delay was long among adult TB patients in Kirinyaga County with a high prevalence of 61%. The findings were similar to a study conducted by Maior et al in 2012 where the conclusion was that the patients had experienced unacceptable levels of long total delay.[5] Over 50% (mean) of the patients took 11 weeks and above from the onset of symptoms to the start of TB treatment. Another study by Dantas et al reported that the majority (50%) of the participants had experienced a long total delay in seeking TB treatment.[4]

The study equally demonstrated a significant association between individual factors and total delay in TB treatment. The patients' education level illustrated a significant association with TB total delay at a p value of 0.028. Patients who had primary education level as their highest education level were 49% less likely to experience TB total treatment delay compared to those who had achieved secondary school education. A study done in Ethiopia by Arja et al in 2021 found that primary school level patients had long patient delay compared to secondary and above level of education at a p value of 0.0001.[19] This could be due to self-treatment by educated patients compared to uneducated patients who are likely to go to the hospital in case of any symptom without trying to treat themselves hence a short total delay.

The study findings also indicated that the occupation status of the patients influenced the total delay in TB treatment among the patients. The occupation status of TB patients was significantly associated with TB total delay at a p value of 0.012. A study done by Kunjok et al in 2021 reported occupation to be significantly associated with total delay in Isiolo County p value of 0.006.[20]

Additionally, patients with comorbidities were 73% less likely to experience total delay in TB treatment compared to those who had no commodities at a p value of 0.001. A study done by Kunjok et al in 2021 reported that patients with comorbidity were less likely to delay TB diagnosis compared to those without.[20] This could be because patients with comorbidities are likely to get educated about TB as well as be screened during other clinic visits hence short TB total delay.

Overall, this study suggested the presence of determinants of health-seeking behaviors that lead to total delay in TB treatment. The study highlights the importance of early seeking TB care, diagnosis, and treatment. The study also highlights the need for contact investigation which was also a key conclusion in a study done in Nairobi, Kenya.[21] The findings have significant implications for policies and practices in areas of TB control programs to achieve the sustainable development goals 2030. They suggest that interventions aiming at enhancing short total delay could be effective.

The study encountered limitations related to the fear and stigma of acquiring COVID-19 infection. Additionally, due to COVID-19 guidelines, the TB clinic distributed the patients across the month to facilitate social distancing during clinic days hence, the researcher had to visit the facilities frequently thus expensive.

CONCLUSION

Overall, total delay in TB treatment among adult TB patients was higher in Kirinyaga County. Considerably, only a small number experienced a short level of TB total delay which is acceptable in TB treatment. Nearly three-quarters of the patients had experienced moderate and longer delays. A higher proportion of patients were delayed in seeking care which translates that there is a higher number of community members who might be having the TB signs and symptoms but delaying to seek TB services. Due to the nature of the infection, the number of patients that reported delay in diagnosis and treatment demonstrated that in Kirinyaga County, TB patients experience delay in diagnosis and commencement of treatment which could be a result of failures of the health system hence the need for further research. The study found out patients' knowledge was a predictor for poor health seeking behaviours hence healthcare provider should consistently offer health education both at the community level and facility level.

The study found that there was a significant association between individual factors and total delay in TB treatment. Patients' education level, employment status, and comorbidity status influenced total delay in TB treatment. However, age, sex, distance to accessibility to the health facility, and knowledge were not found significantly associated. These findings alarmed the need for urgent intervention addressing the factors of health-seeking behaviors and total delay in TB treatment.

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