

Patient Related Factors Influencing Timely Diagnosis of Tuberculosis in Tharaka Nithi County, Kenya

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ABSTRACT

Globally, the control of Tuberculosis (TB) has remained a public health challenge despite numerous prevention and treatment programs. Kenya is ranked among countries with a high TB burden globally and has the highest incidences of all types of tuberculosis compared to other East African Countries. The high prevalence of TB in Kenya been attributed to delays in the diagnosis of TB. The consequence of the delays has been the increased spread of the disease, disease advancement, poor treatment outcomes, and high cost of patient treatment and care the affected populations. The aim of this study was to assess patient related factors influencing timely diagnosis of TB in Tharaka Nithi County. Tharaka Nithi County is among the counties with the highest prevalence of TB in Kenya. The study adopted a descriptive cross-sectional survey study design. A sample of 154 patients randomly selected from three hospitals in Tharaka Nithi County was used. A self-administered questionnaire was used to collect data. The data was analyzed using both descriptive and inferential statistics. Associations between patient related factors and duration of TB before diagnosis was tested using Chi-square. The study findings revealed that most (70.86%) of TB patients had delayed diagnosis. Persistent cough was the major sign that led patients to seek for care, while believe that signs and symptoms would disappear was major reason for delay in seeking treatment and care. Sex, age, marital status, employment, self-medication, stigma, work and smoking history were the patients related factors significantly associated with timely diagnosis of TB ($P < 0.05$). The study recommends promotion of care seeking behavior through raising public awareness on tuberculosis, enhancing active case findings, strengthening community-hospital referral systems, boosting health system partnerships for early detection of TB.

Keywords: Timely diagnosis, Patient Related, Tuberculosis, Delay.

INTRODUCTION

Globally, the control of Tuberculosis (TB) has remained a public health challenge despite numerous prevention and treatment programs in place⁽¹⁾. In 2017 alone 10 million people were newly infected, and 1.3 million individuals died of TB⁽²⁾. Additionally, an estimated 3 million cases of TB were believed not to be diagnosed in 2019 alone⁽³⁾. To address the raising incidences of TB, WHO member states in

2015 launched a plan to eradicate TB by 2035⁽⁴⁾. However current efforts have achieved a 2% annual decline rate between 2015 and 2020 compared to a 4-5% benchmark^(2,3). The implication is that the goal to end TB by 2035 may not be achieved. Thus, continued spread, disease advancement, increased morbidity and mortality⁽⁵⁾. The major problem in the control of TB has been delay diagnosis of the disease.

Delay in diagnosis is major setback in the control of TB in developing nation ⁽⁶⁾ and is the major cause of high TB prevalence in Sub-Saharan region ⁽³⁾. The other factors that are associated with high TB prevalence in Sub-Saharan Africa include poor health infrastructure, poverty, and high prevalence of HIV/AIDs ⁽⁷⁾. Over reliance of patient presentation at health facilities has been faced by numerous challenges negatively affecting timely diagnosis. Studies in India ⁽⁸⁾ and Nigeria ⁽⁹⁾ reported that the factors affecting timely diagnosis are mainly patient centered. Many other studies have confirmed delays in diagnosis as being due to patient related factors. In India, Ethiopia, Gambia, Uganda and Gambia studies have reported diagnostic delays of 87.4%, 72.3%, 70.1% and 84% respectively ^(8,10,11,12). Some of the patient related factors identified include gender ^(6,11,13); occupation, level of patient education ⁽²⁾; self-medication practice ^(8,14); age ⁽¹²⁾; marital status ^(10,14); smoking history ⁽⁸⁾ and stigma ^(9,14,15). Kenya is ranked among countries with a high TB burden globally ^(13,16) and has the highest incidences of all types of tuberculosis compared to other East African Countries ⁽¹⁷⁾. Despite decades of investments and collaboration between government and non-governmental partners, TB is still the fourth cause of death in Kenya ⁽¹³⁾. Moreover, 52% of the TB cases are not diagnosed on time ⁽¹³⁾ and even, among patients diagnosed with TB, 54% are not reported to relevant authorities for management of the disease ⁽¹³⁾. This increases the risk of TB infection among Kenyan population. In the year 2020, the Ministry of Health (MoH) enacted a TB preventive policy dubbed “The End TB strategy” with aim of zero percent fatality, sickness and suffering linked to TB through timely diagnosis ⁽¹⁸⁾. However, little has been achieved because of delay in diagnosis. Literature reveals delays of patient TB diagnosis is caused by numerous socio-demographic factors ^(1,12,19) that are varied ⁽¹⁹⁾.

In Tharaka Nithi County, the prevalence of TB rose from 248 in 2016 to 274 in 2022 (per 100,000 persons). Tharaka Nithi County also suffers high levels of poverty (40%) and malnutrition (30%). The factors that influence timely diagnosis of TB are still not clear. Given the high levels of poverty and malnutrition in the county, and the easy spread of TB, the disease can turn out to be a major killer disease in the County. There is therefore need to evaluate factors influencing timely diagnosis of TB. Identifying these factors will provide invaluable information needed for enacting targeted strategies to control the spread of the disease within the county.

MATERIALS & METHODS

The study adopted a descriptive survey design. Data was collected from 154 TB patients randomly selected from Muthambi, Chuka and PCEA Chogoria Hospitals. Respondents were selected using simple random. Data was collected using a pre-tested, standardized survey tool adopted from WHO. The tool was tested for reliability using split half reliability test and attained a reliability coefficient of 0.87, above the recommended threshold of 0.7. Data was analyzed using SPSS computer software version 26. Cross tabulation were used to assess relationship between the variables. For comparative purposes with other studies, the researcher categorized the results into no delayed diagnosis (<21 days) and delayed diagnosis (>21 days) adopted from WHO cutoff limits. Results were presented using percentage and frequencies. The study was approved by Chuka University Ethics and Research Committee (NACOSTI/NBC/AC-0812) and a research permit obtained from NACOSTI (NACOSTI/P/23/24959). Permission to collect data was obtained from relevant hospital administrators. The researcher observed all the required ethical consideration of voluntary participation, consent signing, and autonomy among others during data collection.

RESULT

Patient Socio-demographic Characteristics

The study sought to determine the sociodemographic characteristics of the TB patients. The results are presented in Table 1 below.

Table 1: Socio-demographic Characteristic of TB patients

Variables		Frequency	Percent
Respondents' gender	Male	85	56.29
	Female	66	43.71
	Totals	151	100.0
Respondents' Age	20-30	33	21.85
	31-40	48	31.79
	41-50	44	29.13
	Over 50	26	17.22
	Totals	151	100.0
Respondents' Marital status	Single	21	13.91
	Married	84	55.62
	Divorced	27	17.88
	Widowed	19	12.58
	Totals	151	100
Respondents' education status	Informal	17	11.26
	Primary	49	32.45
	Secondary	57	37.75
	Tertiary	28	18.54
	Totals	151	100.0
Respondents' Occupation	Unemployed	47	31.13
	Self employed	74	49.01
	Formal	30	19.86
	Total	151	100
Respondents household income	<10,000/=	88	58.28
	10,000-20,000/=	23	15.23
	>20,000/=	40	26.49
	Totals	151	100.0
Facility of treatment	Muthambi hospital	31	20.53
	Chuka referral hospital	86	56.95
	PCEA Chogoria hospital	34	22.52
	Totals	151	100.0

Table 1 shows that the mean age of respondents was 38.71years (SD 13.63), with nearly a third (31.75%) of the respondents aged 31-40 years. The median and modal age of the patients was 36.0 and 42 years respectively. It was observed that more than half (56.26%) were male. Most (55.62%) of the respondents were married and only 12.58% were widowed. The distribution on level of education attained showed that (37.75%)of the respondents had attained secondary education, 32.35% primary education, 18.54% post-secondary education and only 11.26% had informal education. Almost half (49.01%) of the respondents were self-employed; only 19.86% had formal employment. Most (58.28%) of the respondents were from households with a monthly income of <10,000/=, 26.49% from nuclear families making >20,000/= and only 15.23% were

making monthly income of between 10,000/= to 20,000/=. Approximately half (56.95%) of the respondents sought care from Chuka Hospital, 22.52% sought care from PCEA Chogoria Hospital and the rest 20.53% from Muthambi Hospital (Table 1).

Timely diagnosis of TB

The study sought to establish the number of respondents diagnosed on time. The results are presented in figure 1 below

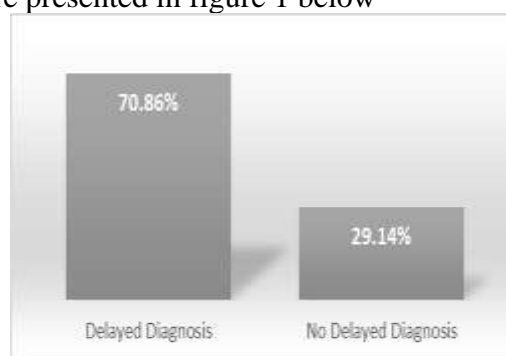


Figure 1: A bar chart on Uptake of diagnostic services

It is observed from Figure 1 that majority [70.86 % (n=107) of the respondents were reported not to been diagnosed within the recommended time.

Reasons for Patients seeking diagnosis

Nearly half (51.9%) of the respondents reported that persistent cough was the reason for seeking diagnosis. Other symptoms that led patients to seek care include fatigue (18.1%), chest pain (17.4%), loss of appetite (14.8%), profuse night sweat (9.4%), and weight loss [(6.7), Table 2]

Table 2: Symptoms that made patients Seek Care.

Which symptoms made you seek care first?	Responses		Percent of Cases
	N	Percent	
Persistent cough	120	51.9%	80.5%
Profuse Night Sweat	14	6.1%	9.4%
Chest pain	26	11.3%	17.4%
Blood sputum	12	5.2%	8.1%
Fatigue	27	11.7%	18.1%
Weight loss	10	4.3%	6.7%
Loss of appetite	22	9.5%	14.8%
Total	231	100.0%	

Reason for Delaying in Diagnosis

Study respondents were asked reasons for delays in diagnosis. The results are presented in Table 3 below.

Table 3: Respondents Reasons for delayed diagnosis

Reasons for delaying seeking medical care	Responses		Percent of Cases
	N	Percent	
Was on treatment for other conditions.	21	4.7%	13.9%
Had no time due to busy.	78	17.3%	51.7%
The hospital are far.	61	13.5%	40.4%
I did not have money.	92	20.4%	60.9%
Thought the symptoms would disappear.	117	25.9%	77.5%
Believed TB is caused by witchcraft.	26	5.8%	17.2%
Was not aware where to get TB services.	40	8.9%	26.5%
I do not have any reason.	16	3.5%	10.6%
Total	451	100.0%	

It can be observed from Table 3 that many (25.9%) of the respondents reported the belief that symptoms would disappear as reason for delaying seeking diagnosis after noticing symptoms, accounting for 77.5% of the cases. Other reported reasons include: financial constrains (20.4%) constituting for 60.9% of the cases, busy schedule and lack

of time (17.3%) accounting for 51.7% of the cases (Table 3).

Patient Related Factors Influencing Timely Diagnosis of TB

The study sought to establish patient related factor influencing timely diagnosis of TB and the results are presented in table 4 below.

Table 4: Relationship Between Patient Related Factors and Timely diagnosis of TB

Variable		Diagnostics duration			Statistics
		No delay	Delay	Total	
Gender	Male	18 (11.92)	67(44.37)	85(56.29)	$\chi^2(1, N = 151)$ = 5.971, p = 0.015
	Female	26 (17.22)	40(26.49)	66 (43.71)	
	Total	44 (29.14)	107 (70.86)	151(100.0)	
Age	20-30	17(11.26)	16(10.60)	33(21.86)	$\chi^2(3, N = 151)$ = 10.470, p = 0.015
	31-40	12(7.95)	36 (23.84)	48 (31.79)	
	41-50	9(5.96)	35 (23.18)	44 (29.14)	
	>50	6(3.97)	20(13.25)	26 (17.22)	
	Total	44(29.14)	107(70.86)	151(100)	
Education	Informal	6 (3.97)	11(7.28)	17 (11.26)	$\chi^2(3, N = 151)$ = 1.2901, p = 0.731
	Primary	14 (9.27)	35 (23.18)	49 (32.45)	
	Secondary	18 (11.92)	39 (25.83)	57(37.75)	

	Tertiary	6(3.97)	22 (14.57)	28(18.54)	
	Total	44(29.14)	107(70.86)	151(100.00)	
Marital	Single	11(7.28)	10(6.62)	21(13.90)	$\chi^2(3, N=151)$ = 11.732, p = 0.008
	Married	27(17.88)	57(37.75)	84(55.63)	
	Divorced	4(2.65)	23(15.23)	27(17.88)	
	Widowed	2 (1.32)	17(11.26)	19 (12.58)	
	Total	44 (29.14)	107 (70.86)	151 (100.0)	
Employment	Unemployed	16(10.59)	31(20.53)	47(31.12)	$\chi^2(2,N=151)$ = 6.643, p = 0.036.
	Self-employed	25(16.56)	49(32.45)	74(49.01)	
	Formal	3(1.99)	27(17.88)	30(19.87)	
	Total	44 (29.14)	107 (70.86)	151 (100.0)	
Income	<10,000/=	27(17.88)	61(40.60)	88(58.28)	$\chi^2(2, N=151)$ = 1.8576, p = 0.395
	10000-20,000/=	4(2.65)	19(12.58)	23 (15.23)	
	>20,000/=	13(8.61)	27(17.88)	40(26.49)	
	Total	44 (29.14)	107 (70.86)	151 (100.0)	
Self-medication practice	No	17(11.26)	9(5.00)	26(17.26)	$\chi^2(1, N=151)$ = 19.983, p = 0.000
	Yes	27(17.88)	98(64.90)	125(82.78)	
	Total	44(29.14)	107(70.86)	151(100.00)	
Fear other known about TB infection (Stigma)	No	14(9.27)	9 (5.96)	23(15.23)	$\chi^2(1, N=151)$ = 13.230, p = 0.000
	Yes	30(19.87)	98(64.44)	128(84.11)	
	Total	44(29.14)	107(70.86)	151(100.00)	
Work interferences	No	27(17.88)	42(27.81)	69(45.69)	$\chi^2(1, N=151)$ = 6.143, p = 0.013
	Yes	17(11.26)	65(43.05)	82(54.31)	
	Total	44(29.14)	107(70.86)	151(100.00)	
Smoking History	Quitted	26(17.22)	64(42.38)	90(59.60)	$\chi^2(2, N=151)$ = 9.497, p = 0.009
	Smoking	2(1.32)	23(15.23)	25(16.56)	
	Never	16(10.60)	20(13.25)	36(23.84)	
	Total	44(29.14)	107(70.86)	151(100.00)	

From Table 4 above, it was observed that out of 70.86% of the respondents diagnosed late, nearly two thirds (44.37%) were male respondents. The association between gender and duration of TB before diagnosis was significant (χ^2 (1, N=151) =5.9714, p=0.015). Delayed diagnosis trends did not differ greatly among respondents aged 31-40(23.84%) and 41-50(23.18%) years. On examining the association of age and diagnostic duration, a significant association was indicated (χ^2 (3, N=151) =10.470, p=0.015). Patients level of education did not influence diagnostic duration in this study (χ^2 (3, N=151) =1.2901, p=0.731) though high proportion of respondents not diagnosed on time were identified among respondents with secondary (25.83%) and primary (23.18%) education. Only 7.28% respondents with informal education delayed in their diagnosis. Out of 84(55.63%) married respondents, 57(37.75%) delayed in diagnosis. Only 1.32% of the respondents who are widowed were diagnosed on time. Further analysis established a relationship between marital status and duration of TB diagnosis (χ^2 (3, N=151) =11.732, p=0.008).

The association between patients' employments status and duration of TB before diagnosis was significant (χ^2 (2, N=151) =6.643, p=0.036). Almost a half (32.35%) of the respondents who experience diagnostic delay (70.86%) were self-employed. Out of 107(70.86%) respondents who delayed in diagnosis of TB, 31(20.53%) were unemployed and 27(17.88%) had formal employment. Similarly, the study further established an association (χ^2 (1, N=151) =6.143, p =0.013) between work interference and duration of TB before diagnosis. More than half (54.31%) of the total respondents reported that work hindered them from assessing TB treatment services and most (43.05%) of them were diagnosed after the recommended time. On the other side, monthly household income did not influence diagnostic duration of TB (χ^2 (2, N=151) =1.8576, p =0.395). Out of 88(58.28%) of the respondents from household making less than 10,000/= monthly, 61(40.60%) were not diagnosed with recommended time. Only 4(2.65%) of respondents from household making between 10,000/= to 20,000/= were diagnosed with specified time (Table 4).

The Majority (82.78%) of the respondents practice self-medication prior to diagnosis of TB after experiencing symptoms and 17.26% did not. Out of 107(70.86%) of respondents reported delay in diagnosis, 98(64.90%) of them engaged into self-medication practices. Further analysis indicated a relationship between practice of self-medication prior to TB diagnosis and duration taken before TB is diagnosed (χ^2 (1, N = 151) =19.983, p = 0.000). Likewise, an association between stigma and duration taken before TB is diagnosed was established (χ^2 (1, N = 151) =13.230, p=0.000). The majority (84.11%) of the patients reported fear of others knowing that they have TB and 15.23% reported of not fearing if others knew they were infected with TB. Approximately, more than three quarters (98 out of 107) of respondents with delayed diagnosis feared their diagnosis known. Moreover, respondents' history of smoking was found to influence duration of TB diagnosis (χ^2 (2, N=151) =9.487, p=0.009). More than seventy five percent of the respondents were reported to have a history of smoking. Out of 107(70.86%) of the respondents reported not to be diagnosed with recommended time, 64(42.38%) were reported to have quit smoking, 23(15.23%) were reported to be currently smoking and 20(13.25%) were reported to have ever smoked (Table 4).

DISCUSSION

The majority (70.86%) of the respondents were reported to have delayed in diagnosis in this study. This finding is similar to findings of studies in India, Ethiopia, Gambia, Uganda and Gambia which reported diagnostic delay of 87.4%, 72.3%,70.1% and 84% respectively^(8,10,11,12). The differences in the frequencies reported in these studies may be due to differences in research settings, sample size as well of cut-off points for the duration of TB diagnosis. Data gathered revealed that more male (56.29%) sought care than female (43.71%). This finding corroborates with results reported in studies in India and Ethiopia

which reported 66.7% and 55.7%, respectively male care seeking behavior^(4, 8). In addition, according to latest survey, there were 809(males) and 359(females) per 100,000 people diagnosed with TB in Kenya^(6,13). This may be due to support to seek care from their spouses. Although, there was significant delay among both genders' timely diagnosis in this study. In this study, age was reported to influence TB diagnostic duration (p<0.015), the highest proportion of diagnostic delay was in the age bracket of 31-50 years. This finding is in line with finding in a study done in Gambia which established a connection between diagnostic delay and age group of 30-49 years^(12, 20). Possible this may be due busy schedule of the respondents considering this is the economically productive age group.

There was no significant association between level of educational and duration of TB before diagnosis. This finding differs from findings of other studies which reported a significant relationship between level of education and duration before TB diagnosis^(2, 4,21). The results of this study also established an association (p<0.008) between marital status and duration of TB before diagnosis. More than half of respondents with delayed TB diagnosis were married. This supports the finding of a study in Ethiopia which reported that 70.0% of its participants with diagnostic delay were married and further established a relationship between the two variables⁽¹⁰⁾. Nevertheless, this finding differs with a study finding by Owolabi in Gambia, who reported that marital status was not associated with TB delay⁽¹²⁾. This study finding, established a relationship between employment status and duration of TB before diagnosis(p<0.036). This was also reported by Kunjok et al and Getnet et al, which reported of an association between occupation and diagnostic delay^(2,22). Moreover, in this study, it was established work interferences influenced diagnostic duration (p<0.013). This concurred finding in Gambia which reported that diagnostic

delay was more pronounced among patients with work⁽¹²⁾. Probably this may be due to lack of time and capital for medical expenses. Interestingly, household income was established not to influence diagnostic duration in this study ($p < 0.395$). A similar study finding was reported in Indonesia in which household income did not affect duration before diagnostic⁽²³⁾.

In this study, practice of self-medication prior to TB diagnosis was reported to influence the duration of TB before diagnosis ($p < 0.000$). These findings are congruent with other studies which reported engagement into self-medication among TB symptomatic patients prior to diagnosis as a precipitator to diagnostic delay^(4,8,14). This may be due to subsiding of TB symptoms making the patients appear to be well without curing the cause thus lengthening diagnosis. A significant association was established between stigma and duration of diagnosis in this study ($p < 0.000$). This was in agreement with findings of a study carried out in Nigeria and East African nations, which reported a positive association between stigma and diagnostic delay^(9,14,24). Perhaps this may be due to myths linked to low TB cure rate, method of transmission and its association with HIV. Furthermore, a significant association was established between smoking history and duration of TB before its diagnosis ($p < 0.009$). This was in line with finding of a study carried out in India which reported smoking history as a contributory factor to diagnostic delay. This may be due to persistent cough among smokers which is normally misdiagnosed as “smokers cough” among clinicians and the patients. In addition, a meta-analysis study reported of a synergistic effect in prolong diagnosis due confusion between TB cough symptom and smokers cough⁽¹⁹⁾.

CONCLUSION AND RECOMMENDATION

Significant causes of delays to TB diagnosis were established in this study. The factors that contribute to the delay in diagnosis of

TB in Tharaka Nithi County appear to be the same for other countries in Sub Saharan Africa. Most of the respondents reported believe that symptoms would disappear as major reason for delaying seeking care early. Persistent cough was the major symptoms which made sought care followed by fatigue. In addition, gender, age, self-treatment, marital status, employment status, stigma and smoking history ($p < 0.05$) were patient related factors established to influence timely diagnosis of TB. The study recommends that awareness on the need for timely diagnosis be carried out through health education in public for a like Barazas and other social gatherings by health care personnel. The study also recommends enhancing active case findings, strengthening community-hospital referral systems and boosting health system partnerships for early detection of TB. There is also need for further research to establish how health system factors also influence timely diagnosis of TB.

Declaration by Authors

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