Original Research Article

Diagnosis delay and factors associated with delay among tuberculosis patients in Mombasa County, Kenya

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ABSTRACT

Background: Most tuberculosis (TB) transmissions occur between the onset of symptoms and treatment initiation. Early case identification and treatment initiation is an effective method to control the spread of TB, but the lack of a clear understanding about the extent of TB diagnostic delay and the factors contributing to delay continue to derail progress in combating the disease. The purpose of this study was to determine the extent of diagnostic delay and factors associated with delay among TB patients.

Methods: An analytic cross-sectional survey of 302 TB patients on the intensive phase of treatment was carried out to determine the diagnostic delay period among TB patients. Data were collected using a semi-structured questionnaire. The mean patient delay and associations between the length of patient delay and the various independent variables were determined.

Results: The mean diagnostic delay was 47 days, patient delay was 34 days and health system delay was 13 days. Patients with extrapulmonary TB had lengthy diagnostic delay of 81 days. Prolonged delay was associated with low TB awareness.

Conclusions: The study findings underscore the need to improve the quality of TB awareness in the community; campaigns should go beyond providing general information about TB to emphasize on early care-seeking.

Keywords: Tuberculosis, Symptoms, Delay

INTRODUCTION

Despite global efforts to improve tuberculosis (TB) care and control, significant challenges persist. One of the most pressing issues is diagnosis delay, which can result in serious complications, increased mortality rates and transmission of the disease within communities. In sub-Saharan Africa, including Kenya, diagnosis delay remains a major public health concern. In fact, TB is currently the fourth leading cause of death in Kenya, presenting a significant economic burden and negatively impacting the lives of its citizens. Although Kenya has a well-organized national tuberculosis control programme (NTP) which provides easy access and free-of-charge services in public health facilities, accordingly, the latest TB prevalence survey (2015/16), found that the country misses nearly half of the people with TB as well as the majority of people presumed to have TB in the community do not seek health care for their symptoms. These cases contribute to increase transmission, mortality and morbidity, and the effects are severe in the TB patients co-infected with the HIV.[1,2]

The most essential components of TB control are early diagnosis and adequate treatment. Delay in the diagnosis

and treatment of TB may result in more extensive disease, more complications and increased severity of the disease, and is associated with a higher risk of mortality. Factors contributing to delay in diagnosis and treatment of TB are likely to vary depending on the populations in their local settings.[3]

In a recent review focusing on sub-Saharan Africa, the majority of associations were related to the lack of knowledge or enabling factors, the place of first visit for medical attention and travel time from home to the clinic as well as distance from the health facility. Consulting a traditional healer was associated with the patient delay.[4]

Studies have investigated patient and healthcare delays in TB diagnosis worldwide; findings differ by country, setting and population. Therefore, each region needs to identify the extent of and reasons for diagnosis delays to enable the health system to find ways to diagnose as well as to treat the patients as early as possible, and thereby reduce the suffering of patients and transmission of the disease.[5]

METHODS

An analytic cross-sectional study design was adopted to determine the diagnostic delay period among TB patients. The study was carried out in Mombasa County, a high TB burden county in Kenya. The county has 51 TB diagnostic centres and 103 TB treatment centres, among which 50 are public facilities, while 53 are non-state facilities. Mombasa County registered and notified a total of 3,960 cases in 2019, giving a case notification rate of 469/100,000, which is above the national average.[2] All of the 103 TB treatment centres were included in the study, but priority was given to health facilities with high number of patients on the intensive phase (first 2 months) of TB treatment.

The target population was TB patients aged ≥18 years on treatment who were attending the clinic during the study period (March-May 2016). All patients aged ≥18 years also on the intensive phase of treatment (within the first 2 months) were included in the study. Those who had been on TB treatment for more than 2 months or those who were not willing to participate were excluded. A desired sample size of 355 was calculated using Fisher's exact test; however, only 302 patients (those in the intensive phase of treatment) were identified during the study period.

Purposive sampling was used to identify TB treatment health facilities in Mombasa County; health facilities without TB patients in the intensive phase were excluded. A simple random sampling method was applied to obtain the 302 TB patients in the intensive phase of treatment to reduce recall bias. Data was collected using a structured questionnaire, administered in a private room following a clinician review of the patients. The exit interview

approach was used, and the patient provided informed verbal consent prior to the questionnaire. SPSS v20.0 (IBM Corp, Armonk, NY, USA) and MS excel (Microsoft, Seatle, WA, USA) were used to analyse data to obtain comparatives of mean and median of various independent variables against the dependent variable and significance interpreted.

Ethics approval

The study protocol was approved by Great Lakes university of Kisumu, research ethics committee (Protocol ref: No. GREC/009/247/2016) approved on 22 March 2016. Informed consent was provided by all subjects involved in the study.

RESULTS

A total of 302 patients were included in the study; the majority were male (n=191, 63.2%) and 111 (36.8%) were female. The mean age of the participants was 32.54 years (range 18-81).

Majority of the participants were from public facilities (74%), while 26 percentages were from private health facilities; most participants (57%) were receiving treatment at health centres. Majority of the respondents (43%) sought attention at the chemist/pharmacy at symptom onset.

Extent of delay

Sex

Male respondents reported longer delays than females (35.47 days vs. 32.5 days) in seeking care following symptom onset.

Table 1: Sex distribution of respondents and relation to TB diagnosis delay.

Gender	N	Percent (%)	Time before seeking medical attention, (Mean in days)
Male	191	63.2	35.47
Female	111	36.8	32.50
Total	302	100.0	34.38

Form of TB

Length of delay varied depending on the form of TB. Most patients with extrapulmonary TB (EPTB) took longer to seek medical attention (average of eighty-one days), while those with the PTB sought care earlier (average of twenty-two days). The average time taken by all the respondents before care-seeking was thirty-four days.

Table 2: Type of TB in relation with TB diagnosis patient delay.

Types	N	Percent (%)	Valid percent (%)	Time before seeking medical attention, (Mean in days)
EPTB	46	15.2	15.2	81.02
PTB+	205	67.9	67.9	22.68
PTB-	51	16.9	16.9	39.33
Total	302	100.0	100.0	34.38

First TB symptom

Most respondents presented with cough (60.6%) as the first symptom of TB, followed by chest pain (24.5%). The respondents who reported loss of weight as their first symptom of TB took longer (average of 62 days) to seek care, while patients with haemoptysis sought attention early (average of 14 days) (Table 3).

Diagnosis delay

The average time taken by respondents before seeking care was 34 days (patient delay), while the average time taken from first visit to health facility to TB diagnosis was 13 days (health system delay), giving a total diagnosis delay of 47 days (Table 4).

Table 3: First TB symptom in relation to TB patient diagnosis delay.

First TB symptom	N	Percent (%)	Time before seeking medical attention (Mean in days)
Cough	183	60.6	29
Fever	28	9.3	32
Loss of weight	14	4.6	62
Haemoptysis	2	0.7	14
Chest pain	74	24.5	45
Other signs	1	0.3	21
Total	302	100	

Table 4: TB diagnostic delay.

Variables	Respondents	Min	Max	Mean	SD
Time before seeking medical attention	302	1	450	34.38	55.199
Time taken from first visit to TB diagnosis	302	1	46	13.2	11.58

Patient perception of the causes of delay

Majority of the respondents (39.1%) perceived TB diagnosis delay to be associated with poor TB awareness in the community among community members. The underestimation of the disease was also perceived as contributing to delay born of the hope that symptoms would resolve on their own.

Table 5: Perceived cause of TB diagnosis delay.

Variables	N	Percent (%)
Low community education/awareness	118	39.10
Hope that the symptoms would resolve on their own	58	19.20
Fear of what would be diagnosis	41	13.60
Economic constrain	37	12.30
Stigma	37	12.30
Poor staff attitude	8	2.60
Poor quality of the health services	3	0.70

DISCUSSION

Extent of diagnostic delay among patients with TB

The TB diagnostic delay is the time interval between the onset of TB symptoms and TB diagnosis; diagnostic delay comprised patient delay and health system delay. Study findings suggest that patient delay contributed substantially to the delay (about 34 days), while health system delay contributed 13 days, giving a total of 47 days of mean TB diagnosis delay. This is in line with a study in western Kenya, which found the diagnosis delay to be up to 5 weeks, as well the study conducted in the Gambia, which reported a diagnosis delay of 34 days.[6,7]

The median diagnosis delay was found to be 21 days, which agreed with the study carried out in Ethiopia, which reported a median patient delay of 20 days.[8] This was lower than a similar study conducted in Nepal, which found the median patient delay to be 50 days, more than double our findings. This is also lower in comparison with a similar study performed in Tanzania, which found the mean and median time interval between symptom onset to treatment initiation to be respectively 125.5 and 90.0 days.[9,10]

Their study findings are in line with those from a similar study conducted in Ethiopia, which found that the type of TB was associated with the length of TB diagnostic delay.[11] We observed that the type of TB was related to the length of delay; patients with EPTB had the longest patient delay (81 days), followed by those with PTB-(39 days) while those with PTB+ (22 days). These findings thus confirm existence of association between the type of TB and the duration of diagnosis delay, which can be attributed to clinical presentation of the type of TB which are varied. The findings indicate that various factors could have contributed to the delay including how the TB symptoms presented, with weight loss having the highest patient delay of 62 days and haemoptysis having the least patient delay of 14 days (2 weeks).

Association between socio-demographics and TB diagnostic delay among TB patients

Sociodemographic factors played a major role in patient delay in TB diagnosis, with sex being a key factor. We found that women experienced a shorter delay than men (32.5 days vs. 35.47 days). This is in contrast with results reported by a study conducted in Bangladesh where women had significantly longer total mean and median delays than men (63.2 and 61.0 days vs. 60.3 and 53 days, respectively).[12] Distance to diagnostic centre was not a factor in diagnostic delay, as the majority of the respondents had easy access to the TB diagnostic centre. Level of education was associated with diagnostic delay: most patients with primary level of education had higher mean delays than those with tertiary-level education (49 days vs. 14 days). This is in line with findings from other similar studies, which showed prolonged patient delays to be significantly associated with literacy, and that delay was significantly higher among illiterate patients than those who were literate.[11,13]

Association between knowledge about TB and diagnostic delay among TB patients

The majority of study respondents (39%) perceived low community awareness about TB to be a major contributor to patient delay in diagnosis. This is in concordance with findings from other studies that reported poor knowledge about TB symptoms to be among the main risk factors that contribute to delayed diagnosis.[10,11,14]

Relationship between health system response and diagnostic delay among TB patients

Overall, 43.7% of the respondents confessed to having visited a chemist/pharmacy first for over the counter treatment at symptom onset. This shows that the majority of the respondents did not seek treatment from a health facility specialising in TB treatment at first. These findings are similar to those reported by other studies, according to which most patients sought treatment at non-formal health providers, resulting in longer delays in TB diagnosis than among those who visited a formal provider on their first visit.[6,8] These findings suggest that health-seeking behaviour is a big contributor to health system delay.

Most respondents received their TB diagnosis within the first 3 days of visiting a health facility with TB diagnostic capacity, although only 18% sought care at a health facility with TB diagnostic capacity upon presentation of symptoms. The diagnostic delay (health system delay) varied according to type of health facility: public facilities had a slightly better health system response with a delay of 1.8 days, compared to private facilities with a delay of 2 days. However, upon diagnosis, private health facilities had a slightly longer delay of 1.6 days before commencing patients on treatment, while public facilities had a delay of 1.5 days. The delay in diagnosing TB was a significant issue, and health system delay was a key contributor to this problem.[15-17]

Limitations

The length of patient delay was self-reported and thus prone to recall bias. To minimise this bias, only newly diagnosed patients and those in their first 2 months (intensive phase) of TB treatment were included in the study. The patients were asked about the onset of major symptoms, and local calendars and national holidays were used to help patients recall with a degree of accuracy.

CONCLUSION

The study found that the mean patient delay for TB diagnosis was 47 days, comprising 34 days of patient delay and 13 days of health system delay. Patients with EPTB took longer to seek medical attention, with an average delay of 81 days, while those with pulmonary TB (PTB+) sought medical attention earlier, with an average delay of 22 days. Several sociodemographic factors were found to contribute to diagnostic delay, with sex being a key factor, as men delayed seeking medical attention more than women. Additionally, patients with lower levels of education experienced longer delays compared to those with higher levels of education. However, the distance to health facilities was not found to be associated with diagnostic delay. The study also found that low TB awareness among the community was a significant contributor to the delay in diagnosis, with 84.2% of patients delaying due to inadequate knowledge about TB, stigma and fear. Economic constraints were also associated with longer delays. Furthermore, health system response was identified as a contributor to diagnostic delay, with patients visiting health facilities more than three times before being diagnosed with TB.

Recommendations

Several recommendations can be made based on the study findings: TB response strategies should be tailored to focus more on men than women to reduce the diagnostic delay among men. The NTP and its stakeholders need to improve the quality of TB awareness in the community.

Educational campaigns should go beyond providing general information about TB to emphasise the importance of early care-seeking and transmission prevention through early treatment. Most TB patients sought medical attention at a chemist or pharmacy at symptom onset. Thus, there is a need to incorporate this particular category of healthcare provider in TB care and control activities to effectively reduce TB diagnosis delays. Similar studies can be conducted at the national level to determine the extent and contribution of various healthcare providers to patient delays. Additionally, delays to diagnosis and commencement of effective treatment attributable to health system factors should also be investigated.

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