Pre-diagnostic drop out of presumptive TB patients and its associated factors at Bugembe Health Centre IV in Jinja, Uganda

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Abstract
Background: Drop out of presumptive TB individuals before making a final diagnosis poses a danger to the individual and their community. We aimed to determine the proportion of these presumptive TB drop outs and their associated factors in Bugembe Health Centre, Jinja, Uganda.
Methods: We used data from the DHIS2, presumptive and laboratory registers of Bugembe Health Centre IV for 2017. Descriptive statistics were used to summarize the population characteristics. A modified Poisson regression model via the generalized linear model (GLM) with log link and robust standard errors was used for bivariate and multivariate analysis.
Results: Among the 216 registered presumptive TB patients who were less than 1% of patients visiting the outpatients' department, 40.7% dropped out before final diagnosis was made. Age and HIV status were significantly associated with pre-diagnostic drop out while gender and distance from the health center were not.
Conclusion: A high risk to individuals and the community is posed by the significant proportion of presumptive TB patients dropping out before final diagnosis. Health systems managers need to consider interventions targeting young persons, male patients, HIV positive persons.
Keywords: Tuberculosis (TB); Pre-diagnostic drop out; Presumptive TB; SORT IT.

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Introduction
The Uganda National population Tuberculosis (TB) survey of 2014/2015 established that in addition to the TB prevalence and incidence in Uganda being higher than had previously been reported - 253/100,000 and 202/100,000 respectively, much higher than previous estimates of 159/100,000 and 161/100,000 respectively - about half of the cases are missed each year[1].
Amongst those cases that are missed, some are missed

between the point at which they are considered presumptive and where they are fully diagnosed. An individual is considered presumptive at the health facility if they have one of the following: cough for 2 or more weeks; persistent fever for 2 or more weeks; noticeable weight loss; excessive night sweats and if it's a child, poor weight gain or history of contact with a PTB patient[2]. In addition, they may be considered so if they are at high risk for TB (key population) and currently have a cough or - abnormal chest X-ray. Individuals lost between screening and confirmation of active TB are considered pre-diagnostic drop outs. Accurate diagnosis and successful treatment of TB averts millions of deaths annually – about 54 million lives were saved globally between 2000 and 2017[3].

According to the 2014/15 National prevalence study, 39% of individuals with TB symptoms in Uganda did not seek care1. This included presumptive TB patients that might have dropped out of care during the diagnostic period, and diagnosed TB patients that might stop care before initiating treatment or while on a treatment. Elsewhere presumptive TB drop out has also been established as a major problem; in regions of Zimbabwe, India and Pakistan, the loss is estimated at 25%, 30%, and 6 - 28% respectively[4-6]

Several factors have been associated with the loss between screening and final diagnosis, and they include patient-related factors such as poor health seeking behavior, lack of knowledge, poverty, long distances travelled, stigma, discrimination and low access to health services[7,8]. The national TB survey cited inadequate and overworked staff, long waiting times, disrespectful treatment, and drug stock-outs as contributors to poor quality care, deterring presumptive TB clients and known TB patients from seeking diagnosis and treatment at the health facility[1].

Drop out of presumptive TB individuals before final diagnosis are made poses not only a danger to the individual, but is a public health risk as well. While the health of these individuals would deteriorate if they have active TB disease, they are also likely to transmit the disease in the community[9-11].

This study aimed at assessing the pre-diagnostic drop out of presumptive TB cases and their associated factors at Bugembe HC IV, Jinja district. The study was commissioned by the TB supervising office of Bugembe after noticing several things in there host district: Jinja district has an incidence rate of 292/100,000, above the Uganda national average of 201/100,000, and closer to the upper limit of 302/100,000[12]. Furthermore, 1 in 3 of the expected TB cases in Jinja are not captured by the routine TB program[13]. The TB supervisory office of Bugembe therefore felt the need to explore several aspects on the TB situation in their sub-county, including the presumptive dropouts.

Methods

This was a cross sectional study among patients who were screened for TB at the outpatient department (OPD) at Bugembe Health center IV, Jinja District (Eastern Uganda) in 2017. The facility provides in- and out-patient care including TB diagnosis and treatment. The health facility is manned by about 37 medical personnel. The OPD received 40,032 people which is a half of its 83,279 catchment population[14].

A presumptive TB, and laboratory register are maintained at the facility. Patients with suggestive signs and symptoms are screened for TB and sent for a diagnostic test. The diagnosis of TB is confirmed bacteriologically using sputum smear microscopy, culture and/or Gene Xpert.

We included all patients who were recorded in the health facility's presumptive TB register and sent to the laboratory in 2017. We excluded those that appeared in the laboratory register but not the presumptive TB register as they may be referred cases not assessed by the Facility during that time.

Data collection: Data pertaining to the patients was extracted from the two registers. Individuals were considered to have dropped out if their names appeared in the presumptive TB register but not in the laboratory register. Biodata of each patient was also collected.

Data management and analysis: The data extracted was double-entered in EpiData and checked for completeness and accuracy before being exported to STATAV 14 for the analysis. Descriptive statistics were used to summarize the population characteristics. A modified Poisson regression model via the generalized linear model (GLM) with log link and robust standard errors was used for bivariate and multivariate analysis. Statistical significance was considered at a p-value less thn 0.05. We estimated to have a power of 86% at p<0.05 and sample size of 216 assuming that the proportion of those expected to dropout before the laboratory were 30% and a difference of 10% in our setting.

Ethical approval for this study was obtained from Makerere University College of Health Sciences, School of Medicine Research and Ethics Committee (SOM-REC).

Results

Forty thousand, thirty-two (40,032) patients were received at the OPD in Bugembe HC IV between January and December 2017. Less than 1% (216) were recorded in the presumptive TB register, of which 40.7% (88) did not reach the laboratory. (See figure 1)

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┌─────────────────────────────────────────────┐
│   OPD register at Bugembe HCIV (Jan-Dec 2017) │
│                                               │
│                   40,032                      │
└─────────────────────────────────────────────┘
                        │
┌─────────────────────────────────────────────┐
│     In the presumptive Tuberculosis register │
│                                               │
│                 216 (0.54%)                   │
└─────────────────────────────────────────────┘
                        │
        ┌───────────────┴───────────────┐
┌──────────────────────┐      ┌──────────────────────┐
│ Sample reached the    │      │ Did not reach the     │
│ laboratory            │      │ laboratory            │
│    128 (59.3%)        │      │     88 (40.7%)        │
└──────────────────────┘      └──────────────────────┘
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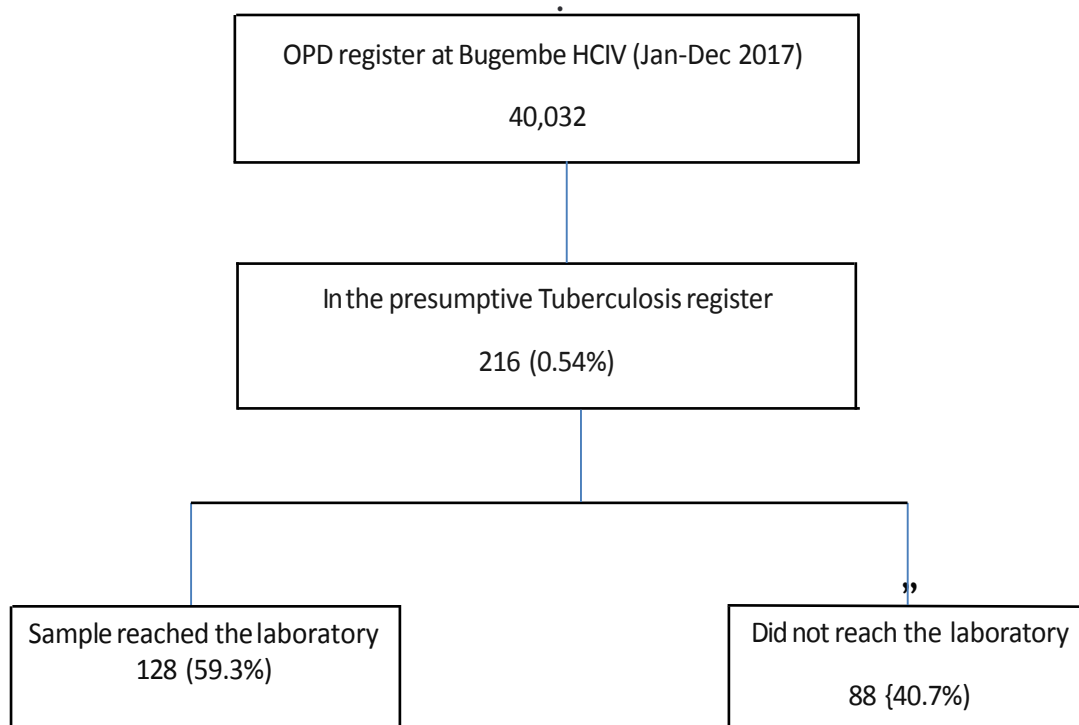
Table 1 presents the basic characteristics of the 216 presumptive TB patients. The mean age of the patients was 31.5 [SD 13.0], majority (37.5%) of whom were between the ages of 18 and 31 years, 64.8% lived 1-4km from the health center, 54.2% were female and 39.4% were HIV positive.

Table 1: Demographic characteristics of the study population

Characteristics		N (%)
Overall		216 (100)
Age: mean (SD)		31.5 (13.0)
Age in years		
	Less than 18	33 (15.3)
	18-31	81 (37.5)
	32-41	47 (21.8)
	Greater than41	55 (25.4)
Sex		
	Female	117 (54.2)
	Male	99 (45.8)
Distance from Health facility (kilometers)		
	<1 km	67 (31.0)
	1-5 km	129 (59.7)
	>5km	20 (9.3)
HIV Sero status*		
	Positive	85 (39.4)
	Negative	131(60.6)

Table 2 explores the factors associated with the dropping out of presumptive TB patients attending the OPD of Bugembe Health Center. Regarding age, the category less than 18, category 32-41 (OR 1.82, p value 0.014) and category above 41 (OR 1.88, P value 0.009) were significantly associated with pre-diagnostic drop out. Furthermore, HIV status (OR 1.43, p value – 0.001) was significantly associated with pre-diagnostic drop out. Gender (OR 1.17. p-value 0.359) was not significantly associated. When it came to distance, in comparison to distance category less than 1km, category 1-5km (OR 1.03, p value 0.808) and category above 5km (OR 0.87, p value 0.554) from the health center was not significantly associated with pre-diagnostic drop out.

Table 2: Bivariate and Multivariate analysis of the factors associated with presumptive TB patients drop out from diagnostic cascade at Bugembe Health Centre IV 2017

Characteristics	Patient reach the laboratory		Unadjusted Prevalence Ratio 95% CI	P-value	Adjusted Prevalence Ratio 95% CI	P-value
	Yes	No				
Overall	128 (59.3)	88 (40.7)				
Age in years						
Less than 18	13 (39.4)	20 (60.6)	1.00		1.00	
18-31	47 (58.0)	34 (42.0)	1.47 (0.93,2.34)	0.101	1.50 (0.94,2.39)	0.086
32-41	31 (66.0)	16 (34.0)	1.67 (1.04,2.68)	0.032*	1.82 (1.13,2.93)	0.014*
42-83	37 (67.3)	18 (32.7)	1.71 (1.08,2.71)	0.023*	1.88 (1.17,3.00)	0.009*
Sex						
Female	72 (61.5)	45 (38.5)	1.00		1.00	
Male	56 (56.6)	43 (43.4)	0.92 (0.73,1.15)	0.463	1.17 (0.86,1.59)	0.359
Distance from Health facility (kilometers)						
<1 km	40 (59.7)	27 (40.3)	1.00		1.00	
1-5 km	77 (59.7)	52 (40.3)	1.00 (0.78,1.27)	0.999	1.03 (0.82,1.30)	0.808
>5km	11 (55.0)	9 (45.0)	0.92 (0.59,1.44)	0.717	0.87 (0.56,1.37)	0.554
HIV Sero status						
Positive	59 (69.4)	26 (30.6)	1.00		1.00	
Negative	69 (52.7)	62 (47.3)	1.32 (1.06,1.63)	0.012*	1.43 (1.16,1.77)	0.001*

*Significant at 5% level of significance

Discussion

This study aimed to determine the proportion and factors associated with dropout of registered presumptive TB patients before final diagnosis in Bugembe HC IV in 2017. We found that 40.7% of the presumptive TB patients did not reach the laboratory. Furthermore, age and HIV status were significantly associated with pre-diagnostic drop out while gender and distance from the health center were not.

Interpretation of findings

The revelation of a loss of 4 patients out of every 10 presumed to have TB is significant. This represents patients whose health is potentially at risk of deteriorating due to late diagnosis and delayed treatment. Worse still, a risk of transmitting the disease to the community which can have a ripple effect. Furthermore, this would affect the country economically by increasing the morbidity and in turn the cost of treatment and care cost[15,16].

Situating in literature

The proportion of presumptive TB drop outs we see in this study is significantly higher than that seen at the national level[1]. While the same proportion of 40% is reported for both presuptive TB and diagnosed patients who might stop care before initiating treatment or while on a treatment, in our study it referred to only presumptive TB patients. A study from Zimbabwe showed an overall pre-diagnostic loss to follow-up of 25%[4] while another study from India indicated a 30 % loss of presumptive TB patients before diagnosis was made[5].

There were more female presumptive TB patients recorded, which is keeping with literature that shows that females with TB have better health seeking behavior than males[17,18]. In line with this, indeed the females in this study were less like to drop out of care before diagnosis, even if this was not statistically significant. This is similar to studies conducted elsewhere by Buregyeya and colleagues in Wakiso district, Uganda who found male gender as an independent predictor for patient delay[19]; and by Tesfahuneygn and colleagues who found male gender significantly associated with non-adherence to anti-TB regimens[20].

We also found that the lower levels of age were more likely to drop out before diagnosis, especially those aged 18 years and below. The reasons for this may vary with a further break down of this age group. For example, children between 0-6 are difficult to diagnose and have their decisions managed by a care taker. Children in the adolescent age group may have to be in school or are involved in menial jobs that may not let them return to the health facility as expected. Pala and colleagues found that the presumptive TB dropout rate was higher among individuals below 15 years compared to those above 41 years in their study which intended to find out the proportion of presumptive pulmonary TB cases who were lost to follow up after consulting the physician for submission of two sputum specimens for diagnosis of pulmonary tuberculosis5, and so did Chanda-Kapata and colleagues in Zambia who found that older presumptive TB patients were more likely to seek care18. A study done by Barter and colleagues showed that TB patients may incur catastrophic costs in utilizing TB services and care and this can be a barrier for many young people seeking care and their families[21]. Ukwaja and colleagues note that these costs for TB care are potentially catastrophic for patients and households, even where services are provided free-of-charge[22].

Those living 5km and more from the health center were more likely to drop out before diagnosis. Indeed, the estimate in this study may even be an underestimate as GPS distances were considered as opposed to actual physical distances. The higher dropout rate coming with increasing distance may be explained by the difficulty that is involved in meeting costs of transport to the health facility. Socio-cultural differences may also begin to come into play as distances increase. A study done by Mauch and colleagues in Kenya noted that geographical and socio-cultural barriers do exist in accessing TB services[23].

HIV negative individuals were more likely to make it to the point of diagnosis compared to their positive counterparts. Ansa and colleagues suggest that the HIV clients might drop out before diagnosis due to stigma(24). Furthermore anecdotal evidence shows that HIV positive patients need to attend several clinics for different reasons brought about by their status, especially in settings where these clinics have not been integrated, although the exact or full impact of integration continues to be investigated in low-income settings[24].

Implications for policy and practice

With a prevalence of dropouts before TB diagnosis of 4 in every 10 patients, the risk to individuals and community is significantly high and calls for interventions to ensure that this is reduced. More targeted programs towards younger persons, male individuals and those living with HIV are important. Specifically, for individuals living with HIV, the call for more integrated services may contribute to the reduction of drop outs. There

is also a need to think through what interventions may be appropriate for persons living far from the health facilities.

Other supportive interventions such as strengthening the counseling and preparation for presumptive TB patients, and improving the linkage to care to reduce loss to follow up before diagnosis, need to be considered.

Implications for further research

This study explored only the variables that are routinely collected by the health facilities which may not answer the research question fully. A study with a more appropriate design may be necessary to explore even more factors associated with presumptive TB dropout.

Furthermore, the study has highlighted the fact that the presumptive dropout rate in Bugembe is significantly higher than that at the national level. There is a need to explore the rates in different settings to ensure that the amount of resources directed towards a given problem actually tallies with the problem as contextualized for the given setting.

Strengths and limitations

This study is making use of the routinely collected data by the health center and regional hospital which is something that not many peripheral centers have made a habit of. It shows the benefit of using local evidence to contextualize problems and solutions.

In addition, this study is looking at one of the issues that is still of great concern – losing patients who are at great risk in the community. This may partly explain the slow reduction of incidences of the disease despite the different interventions in place.

Despite the strengths, this study was limited by the fact that we used routinely collected health facility data. This data may be incomplete and may have collected information about variables that may not completely answer the pertinent questions one has.

In this study we also did not review the laboratory registers of nearby health facilities where some presumptive TB patients could have been diagnosed. There is no known linked register which would highlight these cases and therefore one would need to explore them manually. This could mean an over-estimation of the presumptive TB dropout rate in this study.

As noted earlier, we calculated the patients' travel distance to the health center using GPS distance estimates which assume a straight line between the two points. This may underestimate distances if the actual route is not a straight one, which is morelikely in majority if not all of the distances measured which is likely to introduce a non-differential misclassification.

Conclusion

This study found a 40% prevalence of presumptive TB dropout rates in Bugembe HC IV, significantly higher than the national prevalence. In addition, it found that younger people (less than 18 years) and HIV positive people with presumptive TB were more likely to drop out before diagnosis. The study made use of the routinely collected health center data to highlight the problem and suggest interventions for target groups found to be prone to dropout, and also call for further research that would unearth more factors associated with this dropout. This would ensure better understanding of the problem and appropriately handling it so as to reduce on the risk of persons with transmittable TB in the community.

Conflict of interest

None declared.

Open access statement

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