



Delayed submission of sputum specimen by adult tuberculosis (TB) suspects in Mzimba district in Malawi

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ABSTRACT

Introduction

Tuberculosis continues to be a major cause of morbidity and mortality in the world although the disease is curable even in the presence of HIV infection(1). Sputum examination is one of the methods through which TB cases are detected from the community hence timely submission of sputum specimen is vital in PTB case detection.

Objectives and Methods

The aim of the study was to determine factors contributing to the delayed submission of sputum by adult TB cases in Mzimba district in Malawi. The study design was a cross-sectional study that applied quantitative and qualitative paradigms.

Results

The study found out that 61.5% (N=410, P-v < 0.001) of the participants had adequate knowledge about transmission of TB and 44.1% were aware of existence of MDR-TB. The results also indicated that 62.4 % walk to nearest health centres, 62.2% face travelling problems to access TB services and 13.2% acknowledged existence of operational sputum collection points. The results indicated that 20.5% of the interviewees were not comfortable to disclose or talk about a relatives TB status and 32.0%, P-v < 0.000 of the participants believe that there are traditional drugs that cure cough.

Conclusion and Interpretations

There is an inadequate knowledge and low levels of awareness on transmission and basic aetiological information of TB. There is inadequate accessibility to service points. There are social- economic and cultural beliefs that contribute to delay. There are existing knowledge gaps, beliefs and community TB control operational challenges that affect access to healthcare and submission of sputum specimen by adult TB suspects in Mzimba District in Malawi.

Keywords: Adults, Delayed, Sputum Specimen, Tuberculosis, TB Suspect, Walk-In-Centre, Sputum Collection Point

INTRODUCTION

Tuberculosis continues to be a major cause of morbidity and mortality in the world though the disease is curable even in the presence of human immune-deficiency virus (HIV) infection. According to

Global TB Report 2016, it is reported that there were an estimated 10.4 million new (incident) TB cases worldwide in 2015, of which 5.9 million (56%) were among men, 3.5 million (34%) among women and 1.0 million (10%) among children; while in 2009, there were 9.4 million cases of tuberculosis in the world.¹

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Furthermore; WHO 2016 TB report states that people living with HIV accounted for 1.2 million (11%) of all new TB cases.²

According to National TB control programme 2007,³ many TB cases in Malawi are pulmonary tuberculosis; representing 75-80% of all TB cases and 20-25% are extra pulmonary tuberculosis; which affects other organs outside the lungs. According to the World Health Organization, the case detection rate in Malawi is 49%, the treatment success rate is 86% and the prevalence of tuberculosis is 243 cases per 100 000 people.² High TB prevalence and low case detection is partially attributed to delayed submission of sputum specimen by the adult TB suspects that later may contribute to low case detection and case contact tracing in the community.⁴ For instance, in 2010, 63% of the TB smear positive cases in Mzimba had submitted sputum after coughing for more than three weeks as reported by Mzimba South DHO 2011.

The aim was to determine factors that most contribute to the delayed submission of sputum specimen by adult tuberculosis suspects in Mzimba South Health district. The delay basing on the passive case finding approach where there is self-referral of symptomatic individual or referrals by community to health institutions. The delay basing on the passive case finding approach where there is self-referral of symptomatic individuals or referral by community to health institutions.

METHODOLOGY AND DATA ANALYSIS

A cross sectional descriptive study was conducted.⁵ The study was designed to quantitatively and qualitatively investigate factors contributing to delay in submission of sputum specimen by adult TB suspects. Quantitative approach⁶ was applied to assess knowledge among the Health Surveillance Assistants, adults in the community and the adult TB suspects recruited in the study and to determine which barriers exists that hinder the population from accessing sputum collection points and walk-in-centers. Secondly, a qualitative approach⁷ was applied in inductive reasoning to find out socio-economic factors and cultural beliefs contributing to the delayed submission of sputum specimen or late

TB care seeking behavior from the community. In-depth interviews were conducted by using a semi-structured questionnaire.

The sample sizes was calculated at 5% significance level and 80% statistical power.⁸ The calculated interviewees were as follows; 62 HSAs found in Mzimba South, 71 TB suspects or cases from 2010 - 2012 chronic cough registers and community adults were 354.² The sample calculation formula was used.⁹ The following formula was used; $n_1 = ((Z_{\alpha} + Z_{\beta})^2 * \sigma^2) / d^2$; where; n_1 =calculated sample size, Z_{α} = the probability of falsely rejecting a true null hypothesis {1.96}, Z_{β} = the probability of failing to reject a false null hypothesis at 80% power {0.842}, σ = standard deviation of the population being studied {7 weeks median weeks of delay in submission of sputum; from study that was done in Malawi¹⁰ and delay in Mzimba shows that 63% of the suspects do delay as indicated by Mzimba South DHO reports 2010}, and d = the size of the effect that is clinically worthwhile to detect {submission of sputum within 3 weeks of cough and 20% of the suspects are at least expected to delay when targeted early submission of sputum specimen is at 80% }. $n_1 = ((1.960 + 0.842)^2 * 63^2) / 20^2 = 77$. The calculated sample size was 77 for each stratum.

Quantitative data was entered into database created on SPSS¹¹ software in the computer. After data entry was completed, the data was explored and univariate analyses were run to check quality of data. After checking was done, analyses were conducted to find out frequency of variables.¹² Analysis was done through running descriptive statistics and cross tabulations. In qualitative data; data was transcribed, coded and induced themes were produced for analysis. The thematic contents were analysed to identify assumptions, values, priorities and perceptions with the help of Nvivo.¹³ Cross checking and triangulations were done to establish explanations to the responses provided regarding the research question.¹⁴

The study described variables ranging from demographic characteristics, levels of knowledge of the study groups, availability of resources, distances to nearest health delivery points, mode of transport and list of social-economic and cultural beliefs.

RESULTS**Demographic Characteristics of Population**

A total of 35 TB suspects, 336 adult community members and 39 HSAs were interviewed instead due to shortage of resources and time to conduct follow ups. Therefore, the total interviewed people were 336 people aged over 15 years or over, 35 TB suspects/cases and 39 HSAs. The sample size was

calculated to feasible sizes with respect to sampling populations and availability of support. Table 1 indicates that there were 410 participants (336 community members, 39 HSAs and 35 adult TB suspects/clients) in total with 174 (42%) male while 236 (58%) females. The common range of age of overall sample was between 31-35 years where age range was from 15 – 61 or older.

Table 1 Characteristics of the Participants Separated by Subgroups

Sample Size: Interviewed	Community Members (336)	Suspects (29)	Guardians (6)	HSAs (39)	Total (410)
Baseline Characteristics	Community Members (%)	Suspects (%)	Guardians (%)	HSAs (%)	Total (%)
Sex					
Male	38% (127/336)	55% (16/29)	33% (2/6)	74% (29/39)	42% (174/410)
Female	62% (209/336)	45% (13/29)	67% (4/6)	26% (10/39)	58% (236/410)
	Chisquare=21.358		df 3	P-value <0.0001	
Education					
No Education	15% (51/336)	24% (7/29)	0	0	14% (58/410)
Primary School	69% (231/336)	45% (13/29)	100% (6/6)	0	61% (250/410)
Secondary School	16% (54/336)	31% (9/29)	0	97% (38/39)	25% (101/410)
Tertiary School	0	0	0	3% (1/39)	0.24 (1/410)
Marital Status					
Single	11% (36/336)	10% (3/29)	0	10% (4/39)	10% (43/410)
Married	84% (281/336)	79% (23/29)	83% (5/6)	90% (35/39)	84% (344/410)
Divorced/Separated	1% (5/336)	7% (2/29)	0	0	2% (7/410)
Widowed	4% (14/336)	3% (1/29)	17% (1/6)	0	4% (16/410)
Religion					
CCAP Church	44% (149/336)	31% (9/29)	17% (1/6)	46% (18/39)	43% (177/410)
Other Churches	53% (177/336)	69% (20/29)	83% (5/6)	54% (21/39)	54% (223/410)
Muslims	3% (9/336)	0	0	0	2% (9/410)
No Denomination	0.3% (1/336)	0	0	0	0.24% (1/410)
Tribe					
Turrbuka	81% (271/336)	66% (19/29)	83% (5/6)	72% (28/39)	79% (323/410)
Chewa	8% (30/336)	14% (4/29)	0	8% (3/39)	9% (37/410)
Ngoni	7% (23/336)	7% (2/29)	0	15% (6/39)	8% (31/410)
Other Tribes	4% (12/336)	14% (4/29)	17% (1/6)	5% (2/39)	5% (19/410)
Knowledge on Existence of TB in Community					
Yes	93% (314/336)	100% (39/39)	100% (29/29)	100% (6/6)	95% (388/410)
No	7% (22/336)	0	0	0	5% (22/410)
	Chisquare=5.120		df 3	P-value <0.01845	
Knowledge on Relationship Between HIV/AIDS and TB					
Yes	32% (109/336)	85% (33/39)	35% (10/29)	66% (4/6)	38% (156/410)
No	49% (165/336)	10% (4/39)	41% (12/29)	17% (1/6)	44% (182/410)
Not Sure	19% (62/339)	5% (2/39)	24% (7/29)	17% (1/6)	18% (72/410)
	Chisquare=43.713		df 6	P-value <0.0001	

Level of Knowledge about Control and Symptoms of TB by HSAs, Suspects/Cases and Adult Community Members

Table 2 shows that 94.6% (388) of the participants heard about TB while 22 (5.4%) of participants never heard about TB; and these were all community members; and knowledge about transmission of TB suggests that 61.5% (252) of the participants have adequate knowledge about transmission of TB. The

study suggested that 44.1% (181) of the participants were aware of the MDR-TB while 55.9% (229) were not aware of MDR-TB. However; only 12.4% (51) satisfactorily defined MDR-TB in simple terms.

Table 2 Level of Knowledge about TB Definition and Transmission

Category Sample Size	Community Members (336)	HSAs (39)	TB Suspects/Clients (29)	Guardians (6)	Total (410)
Level of Knowledge on Transmission of TB Bacillus					
Coughing, Sneezing, Contact and Overcrowding	67% (225/336)	100% (39/39)	83% (24/29)	83% (5/6)	71% (293/410)
Sexual Intercourse	4% (15/336)	0	0	0	3.6% (15/410)
Smoking and Alcoholism	0	0	0	17% (1/6)	0.2% (1/410)
Do not Know	21% (69/336)	0	17% (5/29)	0	18% (74/410)
Sharing Utensils or cups and Poor Hygiene	6% (19/336)	0	0	0	5% (19/410)
Others	2% (8/336)	0	0	0	2% (8/410)
Chisquare = 71.423		df 27		P-value <0.0001	
Knowledge on Basic Definition of MDR TB by Participants					
Just Know the Term	255 (93/336)	13% (5/39)	21% (6/29)	33% (2/6)	23% (96/410)
TB not responding to Drugs	8% (27/336)	62% (24/39)	0	0	13% (51/410)
Co-infection of HIV and TB	8% (26/336)	3% (1/39)	10% (3/29)	17% (1/6)	8% (31/410)
Others	2% (8/336)	0	0	0	2% (8/410)
Extra Pulmonary TB	0.9% (3/336)	0	0	0	0.7% (3/410)
Do not Know	56% (189/336)	23% (9/39)	69% (20/29)	50% (3/6)	54% (221/410)
P-value <0.0001					

Figure 1 showed that over 50% of all recruited study subjects have adequate knowledge about the required number of specimens that are needed to be

collected from the TB suspect. Most participants were able to mention either two or three specimens.

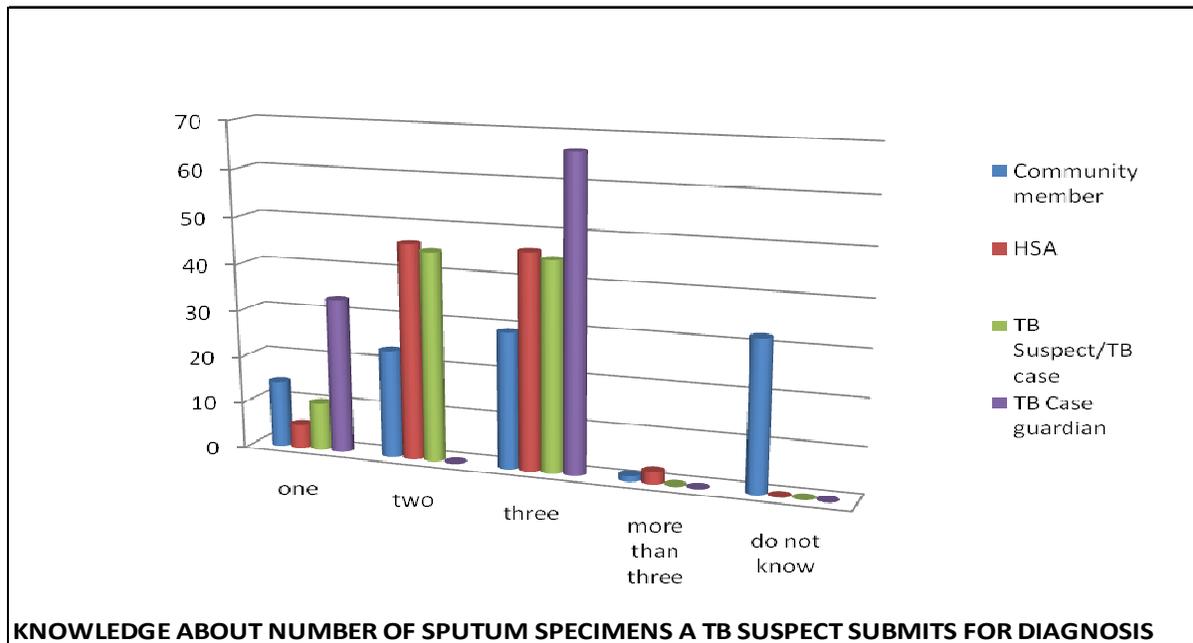


Fig 1 Knowledge about Number of Sputum Specimens a TB Suspect Submits for Diagnosis

Distance and mode of transport for TB suspects to access TB Care and Support Services

The results show that common mode of transport is walking representing 69.5% (285/410).

Table 3 Mode of Transport for TB Suspects to access TB Care and Support

Mode of Transport/ Distance Covered	Do Not Know Distance	<5 KM	5≤10 KM	10≤15 KM	>15 KM	Total
Walking	14.6% (60/410)	26.6% (109/410)	15.2% (62/410)	7.3% (30/410)	5.9% (24/410)	69.5% (285/410)
Cycling and Public Transport	3.7% (15/410)	11.2% (46/410)	8.8% (36/410)	3.4% (14/410)	3.7% (15/410)	30.7% (126/410)
Ox-Cart	2.2% (9/410)	0.5% (2/410)	0	0.7% (3/410)	0.7% (3/410)	4.1% (17/410)
Personal Vehicle	0	0	1.0% (4/410)	0	1.5% (6/410)	2.4% (10/410)
Total	20.5% (84/410)	38.3% (157/410)	24.9% (102/410)	11.5% (47/410)	11.7% (48/410)	

List of Socio-economic and Cultural Beliefs Associated with TB Care Seeking and Control

There are still some people in the community who are not comfortable to reveal or talk about their relatives' TB status. The study found out that 20.5% (84/410) are not comfortable to reveal or talk about TB status of their relatives. Results also show that people still

depend on traditional medicine to cure/treat cough. For instance; 22.0% (90) of participants reported that traditional drugs for cough do exist and availability of the traditional medical practitioners is 36.8%.

On treatment of disease in the communities; it was found out that 22.2 % (91/410) of community members believe that there are some illnesses that

can be cured by only traditional medicine. There were a number of disease conditions that were mentioned to be cured by traditional medicine only. These included psychiatric, epilepsy, asthma and witchcraft related conditions.

On issues of stigma and discrimination; 'name calling', it has been found out that people relate HIV and AIDS to TB. We were asking this question; '**How do people describe a TB patient in local terms in your community?**' They call TB cases; "**munthu wa matenda ya sono aya ya boma ya EDZI**", a person suffering from this deadly and common disease of HIV and AIDS. Many participants reported that people call TB suspects and cases as people suffering from HIV and AIDS.

DISCUSSION AND CONCLUSION

The composition of the study participants was statistically significant. It was very close to true representation of the finding in the 2010 MDHS report.¹⁵ The study recruited 410 participants including 336 community members, 39 HSAs and 35 TB suspects/cases or guardians; all aged 15 or above. The study involved 42.4% male and 57.6% females (Chi-square = 21.358 and p-value < 0.0001).

The results suggest that there are high awareness levels about existence of TB in the community and inadequate knowledge of factors favoring transmission of TB from one person to the other. For instance; the results indicated that 5.4% of the community members never heard about TB while 94.6% are aware (P-value < 0.01845) while MDHS 2010 reports¹⁵ that almost 99.0% of the community members are aware of TB or heard about TB. This survey also found out that 71% of the total participants have adequate knowledge about factors favoring transmission of TB bacteria while the MDHS2010 reports 65% for women and 82% for men. The findings also suggested that 12.4% had satisfactorily defined MDR-TB in simple terms. The results agree with the behavior of majority of TB clients seeking alternative treatment from either traditional healers or groceries.¹⁶ The results show that there is still a knowledge gap existing on level of knowledge about TB in the community which can contribute to reduction in TB health seeking

behavior. The knowledge gap is against the principle of primary health care which emphasizes on full participation and accessibility to essential health care by all individuals and families in the community.^{17, 18} There is still a challenge of diffusion of innovation and adoption of health care services through lack of information, health promotion interventions and inadequate community participation.

Additionally, the study indicated that many HSAs have inadequate knowledge about some terms in TB control. These terms are TB case detection/finding and contact tracing. The study showed that 69.2% of the HSAs are aware of TB case detection while 43.6% satisfactorily explains the term contact tracing. This shows that there is gap in effective message dissemination and passive and active case finding in the community because of the vertical nature of the program since some HSAs feel that it is not their duty to investigate TB in their areas. However, the findings suggested that integration of control programs of the diseases that are categorized as diseases of public health importance and capacity building^{15, 19} is very crucial in achieving better results.

Despite high awareness levels of knowledge about sputum collection points and submission of sputum specimen to the microscopy center. The results suggest that there is 13.2% (Chi-square = 78.943, df 9 and P-value < 0.000) coverage of operational sputum collection points in the community. With reference to Mzimba TB control office; Mzimba mapped 663 sputum collection points across the district thus the finding suggest that operational sputum collection points are approximately 88 out of 663. The study indicates that operating sputum collection points are low such that accessibility to the facilities is low. This, therefore, indicates that primary health care is inadequately fulfilled in most parts of the district with regard to control of TB.¹⁸ Further to shortage in operational sputum collection points; most collection points lack bicycles for transporting the specimen to microscopy centres. The results suggest that only 0.7% (3/410) of the participants mentioned that their sputum collection points have bicycles. However, 29% (119/410) people have access to bicycles in the community. On the other hand, the results suggest that majority of community members face transport

challenges to access health care facilities. The reports indicate that transport is a big problem in Malawi with 37% of roads in poor conditions; unsafe and impassable.²⁰

This problem contributes to inaccessibility to health centers. The common mode of transport is walking 69.5%. The median distance to nearest health facilities lies within less than 5 Kilometers. Almost 30.7% of the community members have access to bicycles and public transport. Despite many people living within 10 Kilometers from the nearest health facilities; 62.2% either change routes during rainy season or have travelling problems in the same route. The finding correlate with the findings of the study that was done in Dedza that showed that patient barriers to TB care seeking include distance/geographical barriers, alternative treatments and poverty.²¹ This shows that accessibility to health care becomes a big challenge when it is rainy season. Literature further says that length of a journey is closely related to mode of transport. For instance; journeys over 12 kilometers, cars are the most means of transport²² while findings suggest that many people in Mzimba walk to health centres. These findings also correlate with the fact that people in developing countries cannot afford to pay for transport to the nearest health facilities due to poor roads and extreme poverty.²³ Poverty and poor road network and bad roads contribute to low accessibility to healthcare. The study found out that there still are some people in the community who are not comfortable to reveal or talk about TB status of a family member. The results showed that 20.5% are not comfortable. The situation seems to have improved in Mzimba because MDHS 2010 reported that 57.0% of the family members in Mzimba would like to hide the status of a member who is diagnosed with TB. Furthermore, it is estimated that about 80% of the rural communities in Malawi consult traditional healers for help before hospital.¹⁶ The situation agrees with the findings that the communities in Mzimba believe that there are traditional drugs that can cure a cough. This is indicated by 22% (P-value < 0.0001) of the participants who reported that there are local drugs that can cure cough. The study that was conducted in Dedza showed that TB patients

seek alternative treatment sources such as private clinics, groceries and traditional healers.²⁴

It is estimated that about 80% of the rural communities in Malawi consult traditional healers for help before hospital.¹⁶ The situation agrees with the findings that the communities in Mzimba believe that there are traditional drugs that can cure a cough. This is indicated by 22% (P-value < 0.0001) of the participants who reported that there are local drugs that can cure cough. The study that was conducted in Dedza showed that TB patients seek alternative treatment sources such as private clinics, groceries and traditional healers.²⁴ Additionally, there are some illnesses that are believed to be cured only by traditional medicine. The disease conditions mentioned were psychiatric and epilepsy, asthma and witchcraft related conditions. These situations are not only in Mzimba, but are also similar beliefs worldwide. For instance; a Chinese person presenting with stomach-ache after experiencing bereavement as a result of death of a family member may be described as suffering from masked depression.²⁵ The situation in Mzimba concurs with the fact that different communities have different perceptions and ideologies about how diseases occur amongst members at different age groups and situations or conditions that may exist; a term called medical anthropology.²⁵ The findings inform us that health interventions should go with understanding of human behaviors, cultural norms and cultural values.

In conclusion; the study found out that there are low socio-economic statuses, inadequate knowledge, physical barriers and bad cultural practices that significantly contribute to delays in submission of sputum specimen by adult TB suspects in Mzimba in Malawi. Operational research need to be conducted to evaluate impact and sustainability of sputum collection points in Mzimba; and empower the community with knowledge on TB control through health promotion program that will target cultural practices and beliefs

LIMITATIONS

The study had some weaknesses like recall and or measurement bias since data collection largely depended on interviewing the participants. There

was no verification of some information such as distance and availability of resources. The data collected was largely dependent on the information provided by the interviewee. However, this problem was minimized through triangulation of the questions, probing and increasing number of participants. The measurement bias was also minimized through pre-testing a questionnaire, training of data collectors and designing simple and short questions that did not require long recall. There was delayed funding to effectively and timely accomplish the research activities. However, this was avoided through writing of research grant proposals, timely completion of the proposal in readiness of data collection.

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