Determinants of Adherence to Tuberculosis Chemotherapy in Nairobi City County, Kenya

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Tuberculosis (TB) is a leading global cause of death and Kenya is among the top 20 countries with a high burden of the disease. Adherence to drugs used to treat the disease remains a crucial challenge towards the elimination of TB in Kenya. This study evaluated the rate and determinants of adherence to TB chemotherapy among adult patients attending health clinics in Nairobi between April and May 2017. A cross-sectional study was carried out in five randomly selected health centres in the Eastlands area of Nairobi involving 113 respondents who voluntarily consented and met the inclusion criteria. Data was collected using a researcher-administered questionnaire and the level of adherence assessed using participants self-reporting. From the results obtained, the participants exhibited low (11, 9.7%), medium (46, 40.7%), and high (56, 49.6%) adherence to TB therapy. Upon stepwise multivariate regression, the absence of a DOT supporter (p=0.039) and being on other medications (p=0.021) were significantly associated with non-adherence. It is inferred that DOT support enhanced adherence while co-morbidities decreased it.

KEY WORDS: Adherence, Tuberculosis, Determinants

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. This disease can be pulmonary or extra-pulmonary [1]. It was one of the top 10 global causes of death across the world in 2015, with the most affected countries being India, Indonesia, China, Nigeria, and South Africa. Africa has the highest TB global burden with an estimated incidence rate of 275 cases per 100,000 people [2]. Kenya is among the top 20 high TB burden countries with an estimated 233 cases per 100,000 people reported in 2015 [3, 4]. The first-line drugs used in TB therapy are isoniazid, rifampicin, pyrazinamide and ethambutol. The treatment for new adult cases involves the use of the four drugs for two months (intensive phase) followed by four months (continuation phase), where rifampicin and isoniazid are used. Adherence to therapy and the successful completion of treatment are critical determinants of the outcome as non-adherence may lead to drug resistance and therapy failure [5,7].

Despite Kenya having taken great strides to reduce the infection rates and deaths due to TB, a significant proportion of patients still default on treatment. Adverse drug events, comorbidities, and high pill burden have been noted as significant factors that affect adherence. Others factors include poverty,

gender, beliefs and patient attitudes towards treatment, social environment and accessibility to health care services [6,7]. Most non-adherent patients' default during the intensive phase of treatment, which is the most critical phase when the patient is highly infectious. During the continuation phase, adherence to medicines has been shown to slightly improve due to the reduced number and side effects of drugs [7]. Some of the interventions that may help improve adherence to TB therapy include adequate patient counseling on expected anti-TB side effects and assigning a directly observed treatment (DOT) supporters to every TB patient. The study evaluated the rate and determinants of adherence to TB therapy in the Eastland area of Nairobi City County.

METHODS

A cross-sectional study was conducted between April and May 2017, at five selected health centres in the Eastlands area of Nairobi, which has a high TB burden. The health centres were Umoja 1, Kayole 1, Dandora 2, Njiru and Kariobangi South, which were randomly selected from the District Health Information Systems (DHIS). The study population comprised adult patients with TB who visited the health centres during the study period. Randomly sampled consenting 113 patients aged at least 18 years old were selected. The number of patients picked from each facility was proportionate to the total number of cases seen at the respective health centres. Data was collected using a pretested researcher-administered questionnaire. The researcher approached the participants during regular clinic days for consent before conducting face-to-face interviews. Information regarding the drugs and other clinical data were abstracted from the medical records. The self -report questionnaire was filled by

the researcher during the interview and used to score the adherence for each participant.

Collected data was entered into MS Excel spreadsheet and exported to STATA version 14 for descriptive and inferential statistical analysis. Stepwise multivariable logistic regression was used to identify the determinants of adherence to TB therapy and a p-value of equal or less than 0.05 was considered statistically significant. The study was conducted after ethical approval by the Kenyatta National Hospital-University of Nairobi Ethics and Research Committee (P53/03/2017). Permission to access the study sites was sought from the county offices, sub-county medical officers, and the respective health facility in-charges. Data was collected from participants who consented voluntarily and handled confidentially.

RESULTS

Out of the 113 respondents, 101(89.4%) were in the 18-44-year age group and the males (66, 58.4%) predominated. A large portion (72, 63.7%) of respondents had normal body mass index (18-25) while 30(26.6%) were underweight (Table 1). A history of smoking cigarettes and drinking alcohol was reported among 34 (30.1%) and 58 (51.3%) respondents, respectively. Ninety-seven (85.8%) participants had at least attained primary education, 31(27.5%) were infected with human immunodeficiency virus and were on highly active antiretroviral therapy, while one (0.9%) was on diabetic treatment.

Prevalence of adverse drug reactions

The main adverse drug reactions reported were reddish colouration of urine (109, 96.5%), neuropathy (52, 46%) as well as nausea and vomiting (52, 46%) as shown in Table 2. Upon experiencing side effects,

most (80, 70.8%) participants went back to the TB clinic to seek medical advice, 25 (22.1%) used over-the-counter medications from community pharmacies, 6 (5.3%) took no action, while 2 (1.8%) stopped taking their TB medications.

Table 1: Sociodemographic characteristics (n=113)

Characteristic	Frequency (%)
Gender	
Male	66 (58.4)
Female	47 (41.6)
Age (years)	
18-25	24 (21.2)
26-34	50 (44.3)
35-44	27 (23.9)
45-54	10 (8.9)
Over 54	2 (1.8)
Body mass index	
Below 18	30 (26.6)
18-25	72 (63.7)
26-30	11 (9.7)
Level of education	
No formal education	3 (2.7)
Primary	43 (38.1)
Secondary	54 (47.8)
Tertiary	13 (11.5)
Household occupants	
Number = 1-3	72 (63.7)
Number >3	41 (36.3)
HIV infection	31 (27.4)
Diabetes	1 (0.9)
History of smoking	33 (29.2)
History of alcohol consumption	58 (51.3)
Presence of DOT support	29 (25.7)

DOT = Directly-observed therapy.

Level of adherence

Based on the patient self- reporting assessment, 56(49.6%) respondents exhibited high, 46(40.7%) medium and 11 (9.7 %) low adherence to TB therapy.

Table 2. Prevalence of adverse drug reactions (n=113)

Side effect	Frequency (%)
Reddish colouration of urine	109 (96.5)
Nausea and vomiting	52 (46)
Numbness of feet and hands	52 (46)
Blurred vision	32 (28.3)
Headache and dizziness	17 (16)
Tiredness and weakness	49 (43.4)
Painful joints	43 (38.1)

Determinants of adherence

Logistic regression analysis was used to identify the determinants of adherence to TB therapy. The explanatory variables were the socio-demographic and clinical characteristics of the participants. Participants without DOT support had 0.36 odds of adhering to TB therapy (AOR=0.36, 95% CI=0.17 -0.95, p= 0.039). Those without co-morbidities were 2.9 times (AOR=2.92, 95% CI=1.17 -7.26, p= 0.021) more likely to adhere to TB therapy.

DISCUSSION

This study reports that female respondents were fewer and more adherent to TB therapy compared to the male. This observation could be explained by the fact that males are more likely to participate in social activities, such as taking alcohol and smoking, which predisposes them to tuberculosis and also reduce adherence to therapy [8]. Similarly, men are more likely to default on treatment compared to women due to their outgoing nature and poor health-seeking behaviour [7]. Approximately half of the respondents had either low or medium adherence to TB therapy, which, if not corrected, could lead to drug resistance, treatment failure and death [5]. The reported rate of adherence is

comparable to that shown in previous studies conducted in Nairobi [7] and Malaysia [9]. However, other studies had recorded much higher adherence in Kenya and Ethiopia [8, 10].

Adverse drug events affect compliance to anti-TB therapy [11]. Patients who experience nausea and vomiting are more likely to be non-adherent. The DOT support, usually provided by relatives and community health workers [12], is important during TB treatment [7]. This support enhances the correct timing of taking the medicines. The supporters also address any concerns the patients may have and forward unresolved ones to the relevant authority. This action reassures the patients and leads to prompt action on any emerging issues, thereby enhancing patient satisfaction and adherence to medicines [12].

CONCLUSION

There was male predominance with majority of participants reporting a history of alcohol consumption. Adherence to TB therapy was relatively high and the main adverse effects were neurological and gastrointestinal disturbances. The determinants of adherence were DOT support and side effects of drugs.

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