GREAT JOURNS

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Socio-Demographic and Economic Factors Affecting the Prevalence of MDR TB among Tuberculosis Patients in Baringo County

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ABSTRACT

In Kenya, tuberculosis remains a principal cause of morbidity and mortality. This study sought to determine the Socio-Demographic and Economic Factors Affecting the Prevalence of MDR TB among Tuberculosis Patients in Baringo County. The study employed the cross-sectional survey design. Using purposive sampling, proportional stratified random sampling, and simple random sampling methods and 263 participants were selected from six sub-county hospitals. Data was collected using structured questionnaires including dichotomous questions (yes and no questions). The experts in the Department of Community Health and Epidemiology improved the validity of the instrument. The tool was pilot-tested to measure its reliability coefficient. The research instrument's reliability was 0.796, which was within acceptable threshold. Descriptive statistics (frequency distributions, means and standard deviation) and inferential statistics (chi-square) were utilized to explore the collected data using IBM SPSS program version 26. The finding of the study revealed MDR TB prevalence among tuberculosis patients in Baringo County to be 14.9%. The study adopted 0.05 Alpha (α) level. The chi-square results indicate that, highest level of education, incomes of TB patients, TB treatment related factors: history of imprisonment, history of migration, behavioural practices, health system and provider factors have no significant relationship with MDR TB prevalence in Baringo County. The results for the correlation are: Fisher's Exact Test = $\chi 2$ = 0.295; Socio-economic factors significantly manipulate the MDR TB prevalence in patients with TB in Baringo County.The researcher recommended that the county government to create awareness and sensitization on TB and MDR TB among the community members.This will help educate the community on the effects of the disease and address the provisional needs of patients, including the provision of DOT, and food.

Key Words: *Socio-Demographic, Economic Factors, Prevalence of MDR TB & Tuberculosis Patients*

1.0 INTRODUCTION

1.1 Socio-Demographic and Economic Factors

One of the demographic parameters that influence MDR TB prevalence is age. D'Souza et al. (2011) found that most MDR TB patients fell in the age range of 15 to 40. Merza et al., (2011) observed that people aged 45 and under have a higher risk of developing MDR TB compared to those above 45. Another important MDR TB risk factor is gender. According to Merza et al., (2011), males are at an increased risk of exposure to MDR TB when compared to the risk of females. The reasons for this disparity are not clear, however, it can be assumed that men engage in activities which make them non-adherent to recommended drug regimens as compared to women.

Low socio-economic status, history of migration, lack of formal education, and poor living conditions as well as changing place of residence when under medication are additional risk factors for developing MDR tuberculosis (Keter et al., 2015). Poor socio-economic status impedes access to health services while lack of agreeable standards of education introduces ignorance, a risk factor for MDR tuberculosis (Metcalfe *et., al.* (2010).

1.2 Problem Statement

Tuberculosis is a key contributor of illness and mortality in Kenya. The country is one of 22 countries with a high prevalence of tuberculosis, which collectively account for 80% of the global TB burden (Global Tuberculosis Report, 2013). The TB treatment defaulter rate in Kenya remains one of the highest at 15%. As a result, MDR TB incidence has risen in the country.

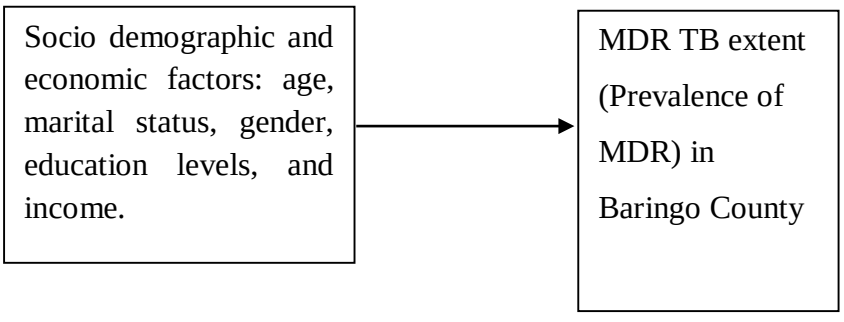
MDR-TB is more challenging to treat, is more fatal and poses greatest challenges in adherence than completing first-line treatment for TB, particularly in resource-scarce settings. MDR-TB risk factors are known but vary from one location to another. Baringo County as an arid and semi-arid area had its own unique risk factors for MDR- TB. There were limited studies on the extent of risk factors among MDR TB patients in Baringo County. Consequently, lack of enough data on MDR TB hampered with efforts to control the condition. Fatality rate among the MDR TB in Baringo was high. It was, however, not clear how the risk factors unique to Baringo contributed to complications and death. This study sought to establish the extent of and risk factors for MDR TB in Baringo County, with the aim to provide information to guide public health interventions to prevent MDR TB.

1.3 Purpose of the Study

The purpose of the study was to investigate the Socio-Demographic and Economic Factors Affecting the Prevalence of MDR TB among Tuberculosis Patients in Baringo County.

1.4 Conceptual Framework

Independent Variables **Independent Variables**



Source: (Researcher, 2011)

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11: MATERIALS AND METHODS

2.1 Research Design

According to Polit and Beck (2007), study design represents the overall plan for the collection and analysis of data, including the specifications adopted to enhance the validity of the study. This study used the cross-sectional survey design of study. The design is appropriate in studying the prevalence of phenomenon, situation problem or attitude of respondents at a particular point in time (Lewin, 2014). Since this study was structured to gain information on MDR TB extent and risk factors TB patients in Baringo County, then, the research design was ideal.

2.2 Variables

Independent variables were; social demographic factors, previous TB treatment, TB treatment related factors, history of imprisonment, history of migration, education-related factors, behavioral practices, health system and provider factors whereas the extent of MDR TB was the dependent variable.

2.3 Study Location

The research was carried out in Kenya's Baringo County. The county has six sub-counties, namely Baring Central, Eldama Ravine, Baringo North, Baringo South, Tiaty, and Mogotio. The study included all sub-county hospitals, that is Mogotio, Eldama Ravine, Chemolingot, Kabarnet, Marigat, and Kabartonjo sub-county hospitals. The current prevalence of tuberculosis in Baringo County was 102 per 100,000 people (Kenya Demographic Health Survey, 2014). The County of Baringo bordered five counties that is: Laikipia, Kericho, Elgeiyo-Marakwet, West-Pokot, and Nakuru Counties. Nomadic pastoralism was the major way of life in the County.

2.4 Study Population

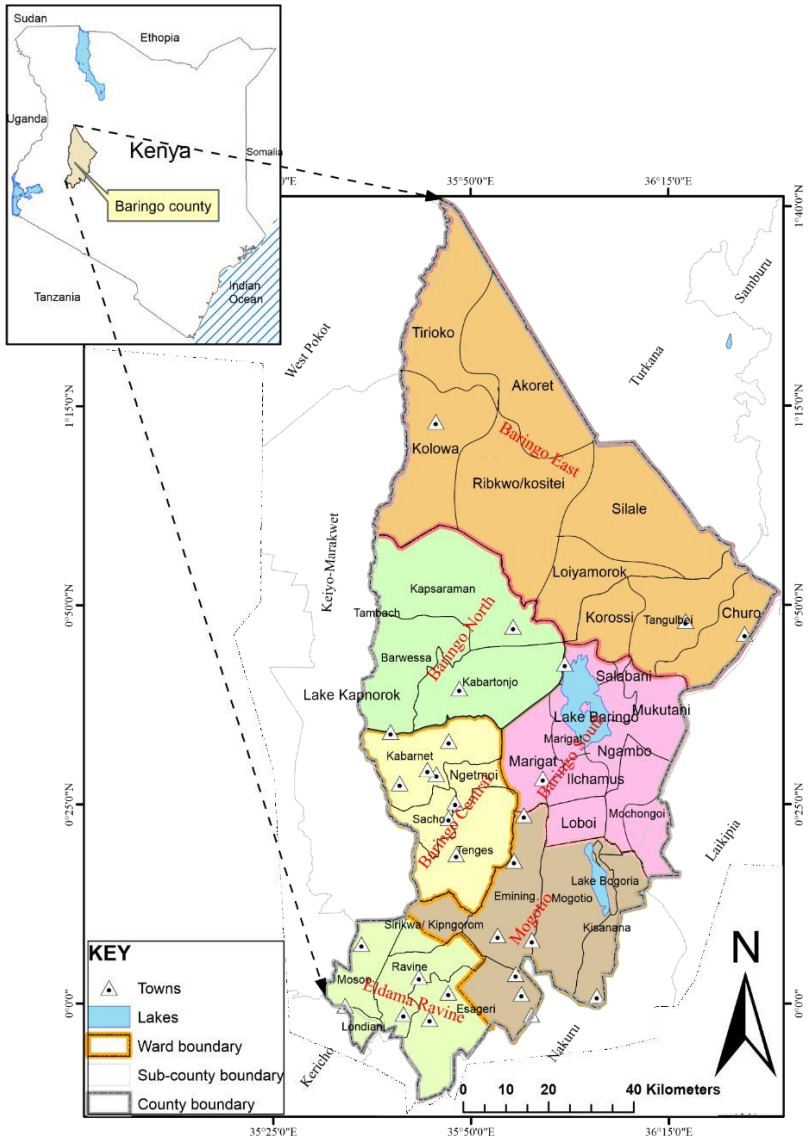
According to Bowling (2002), the study population is a collection of objects or people with similar features of interest to the researcher. The study population comprised all TB patients registered in Baringo County. The total population of Baringo County was 754,014 (Baringo County Population Density and Distribution, 2018). Using the calculation from the county prevalence of TB, the number of TB patients was estimated as (754,014÷100,000) × 102, which gave a target population of approximately 769 TB patients.

2.4.1 Inclusion and Exclusion Criteria

2.4.1.1 Inclusion Criteria

The study included all TB patients' residing in Baringo County who consented to be participants ***in the study.***

2.4.1.2 Exclusion Criteria



Patients with tuberculosis who were severely unwell and did not provide the essential information or who did not consent were excluded from the study.

2.4.2 Sampling Techniques

The researcher adopted purposive sampling technique to select Baringo County as the area of study. The study used purposive sampling to select all sub-county hospitals in Baringo County, including Mogotio Sub-County Hospital (SCH), Koibatek SCH, Tiaty SCH, Baringo Central Sub County Referral Hospital, Baringo South SCH, and Baringo North SCH together with the clinician in-charge of TB-clinics to participate in the study. MDR TB patients are specifically treated in the Sub-County hospitals.

The proportional size of TB patient population of each hospital selected was used, according to Yamane (1967), to assign appropriate sample size (Table 3.1). Additionally, the respondents in each sub-county hospital were sampled using simple random sampling technique to avoid bias.

2.5 Sample Size Determination

The appropriate size of the sample for the study was calculated utilizing Yamane, 1967 formula.

According to Yamane, (1967), $n = \frac{N}{1+ N(e^2)}$

Where:
n - Sample size
N - Target Population
e - Margin of error which is 5%

The total population of Baringo County was 754,014 (Baringo County Population Density and Distribution, 2018). Using the calculation from the county prevalence of TB, the number of TB patients was estimated as (754,014÷100,000) × 102, which gave a sample of 769 TB patients.

$$n = \frac{769}{1 + 769(0.05^2)}$$

n = 263

Table 2. 1: Sample Size Distribution

Sub-County	TB Population Size	Sample size
Koibatek	98	34
Mogotio	89	30
Baringo South	185	63
Baringo Central	184	63
Baringo North	92	32
Tiaty	121	41
TOTAL	**769**	**263**

2.6 Research Instrument

To collect data, the researcher administered open- and closed-ended questionnaire to elicit the data from the TB patients on treatment. The tool was selected because it allows a high level of data standardization and generalization of information (Fisher, et al., 2016). Interview guide was used to collect data from the clinicians working in the selected Sub-County TB clinics. A checklist was used to confirm the date of notification, history of the patient, type of TB, drugs used, DOTs method, laboratory tests sputum for gene expert, culture and sensitivity, and latest test done Appendix 4. The instruments captured socio-demographic factors, previous TB treatment, TB Treatment related factors, history of imprisonment, history of migration, education-related factors, behavioral practices, health system and provider factors to address the objectives of the study.

2.7 Pre-Testing

The instruments of data collection were pilot-tested at Elgeyo Marakwet Sub-County Hospital to check for consistency and the time taken to administer the questionnaire.

A random sample of MDR TB patients was drawn from all TB patients and interviewed in the respective clinics and wards of the hospital. The instrument was refined to eliminate the shortcomings observed.

2.7.1 Validity

Validity, in research, is the appropriateness or soundness of an instrument or test in measuring what it is purposed to measure (Polit & Beck, 2007). Face and content validity are the basics in validity testing. Face validity was tested by submitting the data collection tools to selected individuals to deliberate on their appropriateness to measure the variables concerned. Content validity was tested by subjecting the instruments to scrutiny by experts in the field of TB.

2.7.2 Reliability

Reliability denotes the degree to which an instrument gives the same result when it is applied to different circumstances (Kimberlin, 2008). To achieve the reliability of the data collection tool, a test re-test reliability test was employed: Mugenda & Mugenda (2003), recommends that Depending on the sample size, the pilot test sample should be between 1% and 10% of the projected sample. The calculated sample of this study was 263; therefore, pilot-testing using 26 TB patients was acceptable. The same tool was given to the same people on two different occasions (after two weeks) and compares the scores. The Cronbach's Alpha value of 0.70 and above is regarded as reliable.

For the data gathering instrument, the Cronbach Alpha reliability coefficient was found to be 0.796, which according to Gamble (2018), was above the threshold of 0.7 and hence was considered excellent for study.

2.8 Data Collection Techniques

To collect data from the selected study sample, the researcher administered the structured questionnaire in each Sub-County TB clinic. The TB clinic clinicians were interviewed to collected qualitative data basing on the study objectives. Additionally, the patient's medical records were reviewed to ascertain the date of notification, type of TB, patients' history, drug use history, DOTS method, Gene Xpert and Drug sensitivity test results.

2.9 Data Analysis

When the raw data had been collected, the preliminary analysis was done to clean the data of any inconsistencies and then coded in SPSS. Descriptive analysis; frequencies, means, percentages and standard deviation (SD) was generated to describe the prevalence and attributes of associated factors of MDR TB among TB patients. In addition, descriptive statistics specifically frequencies, were used to generate the MDR TB prevalence rate among patients with TB in Baringo County. Relationship between socio-demographic factors (highest level of education and income) among TB patients and prevalence of MDR TB in Baringo County was established using Chi-square. Data analysis was done using SPSS version 26, a computer aided programme.

2.10 Logistical and Ethical Considerations

Kenyatta University's graduate school granted authorization to perform the study. The study also obtained the Kenyatta University Ethical Review Committee (KUERC) research clearance. The National Council for Science, Technology, and Innovation also granted permission to undertake the research (NACOSTI).

The County Directors of Public Health and Clinical Services in Baringo County were requested to give permission to conduct the study in their facilities. Informed permission was sought from all eligible study subjects. The study's aims and the potential risks and benefits, as well as the intended use of the data collected, were all fully described to participants. To safeguard privacy, names and any other identifiable characteristics were omitted from study instruments to ensure anonymity and confidentiality. In addition, the researcher did not coerce or induced patients to agree to participate. Lastly, the researcher secured informed, written consent in all cases.

III: RESULTS

3.1 Socio-demographic and Economic Factors affecting MDR TB prevalence

Variable		With MDR -TB	Without MDR - TB	Relationship
Gender	Male	22(9.6%)	130(57%)	$\chi 2$=069; df=1; p=0.844
	Female	12(5.3%)	64(28.1%)	
Age (years)	1-18	2(0.9%)	43(18.9%)	Fisher's Exact Test =15.451; p=0.006
	19-30	5(2.2%)	62(27.2%)	
	31 - 45	12(5.3%)	44(19.3%)	
	46 - 60	12(5.3%)	30(13.2%)	
	61 - 75	3(1.3%)	15(6.5%)	
Marital Status	Single	7(3.1%)	60(26.3%)	Fisher's Exact Test =11.904; p=0.023
	Married	19(8.3%)	95(41.7%)	

	Divorced	4(1.8%)	3(1.3%)	
	Widowed	3(1.3%)	10(4.4%)	
	Single Parent	0(0.0%)	2(0.9%)	
	Minor	1(0.4%)	24(10.5%)	
Highest education attained	Primary Education	6(2.6%)	36(15.8%)	Fisher's Exact Test =8.230; p=0.075
	Secondary Education	14(6.1%)	84(36.8%)	
	College Education	10(4.4%)	37(16.2%)	
	Never went to school	4(1.8%)	37(16.2%)	
Religion	ATR	5(2.2%)	30(13.2%)	$\chi2$=16.467; df=3; p=0.001
	Christian	7(3.1%)	102(44.7%)	
	Muslim	8(3.5%)	15(6.6%)	
	None	14(6.1%)	47(20.6%)	
Number People Sharing the Same Room	One	12(5.3%)	51(22.4%)	Fisher's Exact Test =6.490; p=0.075
	2 to 4 people	14(6.1%)	101(44.3%)	
	5 to 7 people	4(1.8%)	36(15.8%)	
	8 and above	4(1.8%)	6(2.6%)	
History of imprisonment	Yes	9(3.9%)	39(17.1%)	$\chi2$=706; df=1; p=0.493
	No	25(11%)	155(68%)	
Employment Status	Yes	7(3.1%)	45(19.7%)	$\chi2$ = 0.112; df = 1; p = 0.738
	No	27(11.8%)	149(65.4%)	
Daily income	Less than Kshs.100	19(8.3%)	118(51.8%)	$\chi2$ = 0.295; df = 1; p = 0.705
	Kshs. 100 – 500	15(6.6%)	76(33.3%)	

The study revealed no significant statistical relationship between gender and MDR TB ($\chi2$ = 069; df = 1; p = 0.844). That means that being male or female didn't matter as much as developing MDR -TB was concerned and that both genders had the disease. According to the study findings, there was no statistically significant link between MDR TB and educational attainment (Fisher's Exact Test = 8.230; p= 0.075), number of people sharing the same room (Fisher's Exact Test = 6.490; p= 0.075), history of imprisonment ($\chi2$ = 706; df = 1; p = 0.493), employment status ($\chi2$ = 0.112; df = 1; p = 0.738), and daily income ($\chi2$ = 0.295; df = 1; p = 0.705). What this meant was that to develop MDR TB it did not matter the level of education one is in, the number of people one is sharing with a room, history of one's imprisonment, one's employment status and how much someone earned daily.

IV: SUMMARY

4.1 Relationship between Socio-economic Factors, Socio-demographic, and Prevalence of MDR TB

The study second objective was to explore the association between socio-economic factors, socio-demographic factors, and MDR TB prevalence in Baringo County.

The findings indicate that, highest level of education and income among TB patients have significant relationship with prevalence of MDR TB Baringo County specified by chi-square results ($\chi2$ (l) = 392.921, P < 0.01) and ($\chi2$ (l) = 108.311, P < 0.013) respectively. This implies that TB patients with higher level of education have a significantly reduced risk of MDR TB incidence. This effect could be linked to ability to understand easily how to deal with TB drugs and importance of finishing TB drugs to hinder the prevalence of MDR TB. This indicates that MDR TB incidence in patients with TB is significantly related to income and education-related factors.

The findings of the study agree with the findings done by Alene et al. (2017) on spatial MDR TB pattern and its associations to socio-economic, household, and demographic factors, where the findings of their study established a significant relationship between sociodemographic aspects, including education level and income with spatial patterns of MDR TB in Ethiopia. The study findings agree with the findings of Ramadhany et al. (2020) on a review of income, societal awareness and attitudes toward TB infection where their findings of the study established that education-related factors significantly influence the MDR TB prevalence in persons with tuberculosis.

V: CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Socio-economic factors significantly manipulate the MDR TB prevalence in patients with TB in Baringo County

5.2 Recommendation

The county government to create awareness and sensitization on TB and MDR TB among the community members. This will help educate the community on the effects of the disease and address the provisional needs of patients, including the provision of DOT, and food

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