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The Factors Impact Tuberculosis Disease Elimination on HIV/AIDS in South Sudan

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Abstract: ***Many countries' researchers have researched the Tuberculosis (TB) disease intensively and tremendously. The TB disease and HIV/AIDS continue to be great threat in South Sudan, to minimize the risks and causing factors that clue to effective control of TB disease and highlighted the most detected factors that impacts TB disease elimination on HIV/AIDS. We aimed at detected factors and test them whether can contribute to TB elimination or has significance impact on TB and HIV/AIDS. In the research, we includes the various approaches to different age groups, medical staffs, patients and some knowledgeable persons in Juba Teaching Hospital. Since the research work is applied quantitative and qualitative method, we collect the information of recorded admitted sick patients in 2017. The particular software used in analysis is SPSS, the statistical methodology of implementation were ANOVA to find level of significance of different means, Chi-Square Test to compare the relationship between TB and HIV/AIDS. Therefore, in this project's recommendations, if is noted well and embraced, it would address the TB disease elimination in the population. This project is proposed towards Tuberculosis disease elimination by looking into current cases detected on individuals with active cases finding within special groups.***

Keywords: Impact Tuberculosis, HIV/AIDS, Elimination, detected factors, ANOVA, Chi Square Test

1. Introduction

Tuberculosis immersed to be among top leading killer for mostly Children and youths in South Sudan, the incidence of tuberculosis infection dropped quite low in the developed towns and high economic class but threaten underprivileged and rural areas mostly especially cattle keepers. However, the as the results of HIV/AIDS infections pave ways for tuberculosis increases in the whole country. TB disease is mistaken by respiratory infection in South Sudan because good laboratories are lacking in South Sudan. TB is air bone disease causes by mycobacterium. HIV/AIDS is the thinnest virus that cripple or attack immune system of the body Behavioral and social setting so as to make an incredible impact on TB elimination efforts.

This research is designed to meet South Sudan situations, particularly Juba to highlight factors or people who are exposure to TB and create into TB elimination policy by reviewing, evaluating the existing program for effectiveness and determine to actions where necessary to minimize the risk factors. Though there is great effort made to stop TB transmission, there is Substantial challenges threaten future TB control [1]. These include multidrug-resistant, tuberculosis disease and human immune deficiency virus co-infection, respiratory disease and socio- economic conditions. Beyond 2030, TB disease control must be consider as less public health threats if level of awareness increase and a vibrant economic development plans that elevate standard of living. To elimination TB disease, the well-defined approaches that exploit technical, operational, modernizations of medical standard to promote nationwide health cover and social safety mechanisms to cover the whole pastoral areas where prevention, diagnostics, and treatment services will be available to avoiding catastrophic. This studies will be an attempt to eliminate tuberculosis disease in South Sudan by developing new approach and looking into the pacific techniques or policies used by ministry of health (MOH) in eradication of TB and examine the risk factor or behavior (RF or RB) in order to address them to policy makers or minister of Health to curve down the world deathly and leading killer disease.

They detail current challenges in effected control including MDR TB and co-infection with HIV and TB, as well as broader socioeconomic matters (2013) [2]. As a social disease, TB prospers cause glooms of prosperity. Conditions associated with poverty facilitate transmission, and malnutrition, abuse drugs promote its progression into active disease [3]. Moreover, the high prevalence of TB among underserved populations, such as the homeless, prisoners, minorities, migrants, and marginalized indigenous populations, within low-income countries is indicative of enduring inequities [4-6]. Although control programs are essential to the care of persons affected by TB and to avoid deaths political stability are crucial factors lashing down the global epidemic.

The research conducted base on the Mathematical Modelling on Infectious Diseases by means of stochastic on TB and HIV epidemiology in South Africa (2012)[7]. In the model, they includes TB and HIV record at an individual-level, with population level incidence sustained by M.TB spread [8]. The model incorporated data on age-structured of social involvement forms, as well as demography [9]. The South African government have created specific National Strategic Plan that attempting to "HIV, STIs, and TB". The objectives is to halve TB related death from 2012 to 2016, with zero infections zero by the year 2032[10].

In 2014, world Health Organization and had determined it objective to achieve TB reduction in 2035 by 95% so as to drop deaths owing to TB [11]. To achieve these goals, a sharp acceleration of TB incidence will be required by expanding access to medical facilities and rapid socioeconomic expansion [12, 13]. This acceleration will be possible through the improvement and speedy commitment of new gears, for example, TB vaccine, and quick treatment of latent TB disease [14, 15]. Therefore, strengthened research and modernization will be considered as the three essential mainstays of the new WHO stop TB disease Strategy [16].

To evaluate the benefits and dangers of LTBI control, with the aim to providing guideline on how to incorporate LTBI control into national TB strategies. The concept to professionals in all the countries around the world, international, local organizations and governments were asked collectively to fight and create programmatic LTBI management that have a duty to consider and evaluate in literature reviews which lead to building new models with less cost-effectiveness [17, 18]. The main modules are to acknowledged, documentation and pointing out the risk groups and factors that causes LTBI progression to active TB, best analytic examinations for LTBI, operative preventive treatment drugs, and to research the possible for relating LTBI mechanism with health systems analyst [19].

2. Research Prime Work

According to the prime work we designed, it require planned behavior and reasoned action theories in order to evaluate and suggested behavior change (awareness) that impact individual thinking or has significant impact mindset on the society in respond to TB disease and HIV elimination. It assume that the higher intention in learning or awareness are more likely to accept TB and HIV/AIDS guide line. As prime Identification, Problem Analysis, Intervention, and Evaluation high correlation of attitudes and subjective norms to behavioral intention, consequently affect individual behavior, has been confirmed by many researchers.

2.1 Healthy Society

In health Society or free TB Stage, It can be achieved by collective efforts from both actors that government and nongovernmental organization to cooperatively to create awareness in Society which require great deal of effort and cooperation for it implementation in structural erection, prevention and treatment method in order to weaken the moderating, mediating factors and MDRTB as pointed out in the TB elimination model. Therefore the TB elimination policy gives the awareness to the following areas.

Contribute to Science
Create the use of Biostatistics, it will lead to new treatment method and news drugs discovery and it makes new invention of machines for analysis

Non-Governmental Organizations
Funding of the scientific and medical research， Support the healthcare and Train volunteers

Government roles
Create conducive environment, Construct more Hospitals and health unites, Collaborate with partners, Make health as priority by using all short of social media or television for awareness, Take into account social cooperate responsibilities by monitoring all the heavy and light industries to align with safety standard and Create National Research Centre.

3. Research Methodology

The conception of this research is based on the fundamental and applied developmental that make easier to consider the impact of TB disease elimination on HIV/AIDS in Juba Teaching Hospital. These include the theory of reasoned action and the theory of planned behavior. the theory of action and theory of planning constructive transformation and behavior change, which can impact tuberculosis disease elimination on HIV/AIDS and other public health imperative research has being undermined in South Sudan compared to other disease despite human or health society is the engine of vital component of economic growth. Therefore the main detected factors in the model are Level of education, Awareness, Level of income, Treatment, funds, HIV/AIDS and demographic data such as gender, age. According to factors detected in the model, give us ideas of statistical analysis methodology of the above variables which determine their impact on tuberculosis disease are Analysis of Variance to test level of significance, Chi-Test Square to test then relationship.

The F-test in one-way analysis of variance is used to assess whether quantitative variable within several pre-defined clusters vary from other. In the ANOVA F-test, we know treatments can be said to be significantly different from the others at level α=0.05[20]. We reject the null hypothesis in favor of Alternative when variables value is greater than the significantly different at level α=0.05. To find the evident that the three variables had relationship, we use chi-squared distribution. Therefore according to detected factors on the model, Chi-Squire Test give us the reality there is or no evidence that the TB and HIV have relationship. If hypothesis test in reference to level of significance 0.05 is less, then there are evidence that the relationship exist within the variables [21]. Chi-Square Test=

$$X^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

3.1 Figures and Tables

Results and discussions
Therefore we used Analysis of variance to examine the dissimilarities among cluster means and experiential variance in an exact parameters which is divided into components attributed to diverse sources of distinction. In this statistical test, the means of numerous groups are compare whether are different or not. Here the level of significance is 0.05 where if the hypothesis tested is great that 0.05, we do not refuse null hypothesis instead favor of Alternative hypothesis.

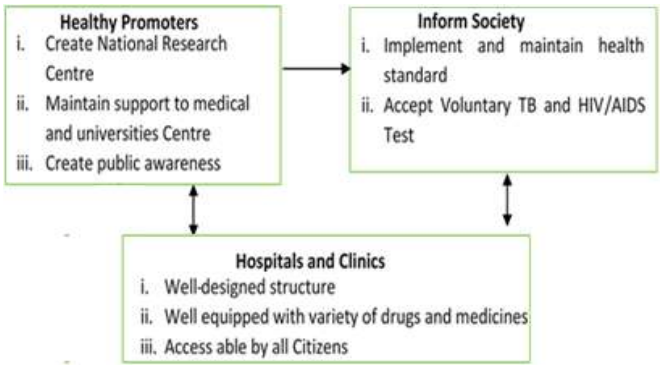

Figure 1: Health society

Table 1: ANOVA formulae

Parameters(S.V)	$SS = \sum(x-\bar{x})^2$	df	$MS = \frac{\sum(x-\bar{x})^2}{df}$	F-stat.	F-crit.
Between groups	$SST = \sum_{i=1}^{k} n_i(\bar{x}_i - \bar{\bar{x}})^2$	k-1	$MST = \sum_{i}^{k} n_i \frac{(\bar{x}_i - \bar{\bar{x}})^2}{k-1}$	$F-stat. = \frac{MST}{N-k}$	
Within groups	$F-stat. = \frac{MST}{N-k}$	N-k	$MSE = \frac{(X_{ij} - \bar{X}_j)^2}{(N-k)}$		
Total	$SS_{tot} = \sum_{i} \sum_{j} (x_{ij} - \bar{\bar{x}})^2$				

Table 2: ANOVA for TB

Parameters (S.V)	Attributes	$SS = \sum(x-\bar{x})^2$	df	$MS = \frac{\sum(x-\bar{x})^2}{df}$	$F-stat. = \frac{MS_{between}}{MS_{within}}$	F-crit.
Gender	Between groups	0.147	1	0.147	0.597	0.441
	Within Groups	50.587	205	0.247		
	Total	50.734	206			
Age	Between groups	27201.665	1	27201.665	116.906	0.000
	Within Groups	47699.388	205	232.680		
	Total	74901.053	206			
Education	Between groups	55.731	1	55.731	1.898	0.170
	Within Groups	6019.574	205	29.364		
	Total	6075.304	206			
Income	Between groups	1.061	1	1.061	26.883	0.000
	Within Groups	8.090	205	3946410.788		
	Total	9.151	206			
Aids	Between groups	301.465	1	301.465	0.054	0.816
	Within Groups	1136316.892	205	5543.009		
	Total	1136618.357	206			
Awareness	Between groups	2.417	1	2.417	7.504	0.007
	Within Groups	66.018	205	0.322		
	Total	68.435	206			

Age (0.000), Income (0.000), Awareness (0.007) < (ॐ =0.05) while Gender (0.441), education is (0.170), funds（0.816）>（ॐ =0.05）

Table 3: ANOVA for HIV

Parameters (S.V)	Attributes	$SS = \sum(x-\bar{x})^2$	df	$MS = \frac{\sum(x-\bar{x})^2}{df}$	$F-stat. = \frac{MS_{between}}{MS_{within}}$	F-crit.
Gender	Between groups	0.186	2	0.093	0.376	0.687
	Within Groups	50.548	204	0.248		
	Total	50.734	206			
Age	Between groups	6497.619	2	3248.809	9.689	0.000
	Within Groups	68403.434	204	335.311		
	Total	74901.053	206			
Education	Between groups	718.401	2	359.201	13.679	0.000
	Within Groups	5356.903	204	26.259		
	Total	6075.304	206			
Income	Between groups	8.133	2	4.067	9.950	0.000
	Within Groups	8.338	204	4087106.248		
	Total	9.151	206			
Aids	Between groups	236407.831	2	118203.916	26.787	0.000
	Within Groups	900210.526	204	4412.797		
	Total	1136618.357	206			
Awareness	Between groups	9.488	2	4.744	20.634	0.000
	Within Groups	46.899	204	0.230		
	Total		206			

Age (0.000), Education (0.000), Income (0.000) Income (0.170), Aids（0.000）and Awareness (0.000) < (ॐ =0.05) while Gender (0.687), >（ॐ =0.05）

The chi-squared test here is used to determine whether there is a significant difference between the expected frequencies and the observed frequencies and check the evident whether there is relationship between HIV/AIDS and TB.

Table 4: Chi-Square Test for HIV/AIDS and TB

		TB (Has TB)	HAS no TB	Total
HIV （Has HIV/AIDS）	Count	118	9	127
	Expected Count	72	55	127
	% within HIV	93.000%	7．000%	100.000%
	% within Years of TB	100.%	10.1%	61.4%
	% of Total	57.0%	4.3%	61.4%
Has no HIV	Count	0	80	80
	Expected Count	46	34	80%
	% within HIV/AIDS	0%	100%	100%
	%within TB	0%	89.9%	38.6%
	% of total	0%	38.6%	38.6%
Total	Count	118	89	207
	Expected Count	118	89	207
	%within HIV	57%	43%	100%
	%within TB	100%	100%	100%
	% of Total	57%	43%	100%

118 persons counted with HIV/AIDS disease as well as tuberculosis disease and 9 people has only HIV/AIDS disease. 80 persons have not both TB and HIV/AIDS.

Table 5： Chi-Square Tests:

	value	df	Asym. (2-sided sig.)	Exact Sig. Sided	2-Exact Sig. (1 sided)
Pearson Chi-Square	1.729	1	0.000		
Continuity Correction	169.111	1	0.000		
Likelihood Ratio	217.895	1	0.000		
Fisher's Exact Test		1	0.000	0.000	0.000
Linear-by-Linear Association	172.046	1	0.000		

X^2 =1.729 and p=0.000 < (ॐ=0.05).

4. Results

1. In ANOVA table 1, Age (0.000), Income (0.000), Awareness (0.007) < (ॐ =0.05) which means the age, income, and awareness have great significance impact on tuberculosis eradication while Gender (0.441), education is (0.170), funds (0.816)> (ॐ =0.05) which means the gender, education, and funds (aids) has no significance impact on tuberculosis eradication.

2. In HIV/AIDS, Age (0.000), Education (0.000), Income (0.000) Income (0.000), and Aids（0.000）and Awareness (0.000) < (ॵ =0.05). Therefore, age, education, income, aids, and Awareness have great positive impact on HIV/AIDS disease eradication, therefore we accepted the null hypothesis while Gender (0.441), >（ॵ =0.05）has no significance impact on HIV/AIDS eradication on TB.

3. In table 3, 118 persons counted with HIV/AIDS disease and has tuberculosis disease and 9 people has HIV/AIDS disease but has no tuberculosis disease. X2 = 1.729 and p=0.000 < (ॵ =0.05). Therefore, there is strong evidence of relationship between tuberculosis disease and HIV/AIDS eradication factor

4. 118 persons counted with HIV/AIDS disease and has tuberculosis disease and 9 people has only HIV/AIDS disease. 80 persons have not both TB and HIV/AIDS which means they have tuberculosis related disease (Respiratory tract infection). If you are using *Word*, use either the Microsoft Equation Editor or the *MathType* add-on (http://www.mathtype.com) for equations in your paper (Insert | Object | Create New | Microsoft Equation *or* MathType Equation). "Float over text" should not be selected.

Number equations consecutively with equation numbers in parentheses flush with the right margin, as in (1). First, use the equation editor to create the equation. Then select the "Equation" markup style. Press the tab key and write the equation number in parentheses.

5. Recommendations

Indeed the Tuberculosis disease Control Program developed in this study will contribute in tuberculosis disease management which required collective responsibilities from both actors that is government and non-government organizations to work hand in hand to create awareness in public and private organizations which require great deal of effort and cooperation for it implementation in structural erection, TB prevention and treatment method to weaken the moderating, mediating factors and MDR-TB in TB disease model.

The proposed TB disease management policy approaches, since is convenience, manageable and can be easily adopted or implemented in rural and urban areas as well as each of individual, the Government must highlight and implement the main detailed factors a such as awareness, treatment, prevention, training in order to eliminate tuberculosis and reduce prevalence of HIV/AIDS. The policy can be enlarged or constricted in the way that its contributions can be integrated with conditions of any society to yield the significant impact on the applied technique since the TB elimination policy in clinic, hospital, as well as public, is concern of every country.

In addition, Level of awareness play significance in TB and HIV/AIDS, Government and Nongovernment organization must carry out in both media, social network, open campaign awareness in schools, churches so as to achieve free TB disease in South Sudan.

6. Conclusions

To achieve Tuberculosis disease effective treatment to take place, Tuberculosis diseases management method must be accepted and modify as new approach since TB is called disease of poverty though it's most expensive due moderating, causing, mediating and MDR-TB which vary from place to place. Tuberculosis disease effective management policy proposes in this research such as the methodology and approach that can be transfer into useful information for decision making. In future, the system needs to be enhanced and expanded.

The tuberculosis effective management has been a top priority in the world since its discovery and many countries successfully manage to silent it alarming nature, therefore, awareness can save both TB and HIV/AIDS in all sectors. In every hospital, tuberculosis program or laboratory set up must be put in place in order to detect the Tuberculosis disease case. The tuberculosis disease management in the society must be prioritized so as to play a greater role to realized economic development since human capital and health personals are very important to realize the grow of domestics products in every country hence stable labors force, minimize the cost and risk population associate with since the TB diseases is easier transmitted from one person to other in many ways.

For the monitoring and evaluation of patients' missed treatment or taking drugs, the appointment to receive treatment must be made. The NTP should ensure that the patient is contacted within a day after missing treatment during the initial phase, and within a week during the continuation phase. The patient can be traced using the locating information previously obtained in register book and it is important to find out the cause of the patient's absence so that appropriate action can be taken and treatment can continue

Therefore the this research outline the main suggestions to be adopted as follow;

1) All patients should be monitored to assess their response to therapy or treatment on the regular bases. Regular monitoring of patients provide or facilitates treatment completion which allows the identification and management of adverse drug reactions. All patients' caretakers and health workers should be instructed to report the persistence or reappearance of symptoms of TB (including weight loss), symptoms of adverse drug reactions, or treatment interruptions.
2) Tuberculosis and HIV/AIDS must be adapted in educational system that it can contribute in awareness process so as the results of the disease prevalence can be minimized.
3) According to medical report and conformed by data called at Juba Teaching hospital shows that many children suffered from tuberculosis disease and are children of livestock keepers which mean they drink unsterilized milk

that might have tuberculosis bacteria since tuberculosis disease can some of the animals which mean they suffered from bovine tuberculosis. Therefore government should give support to farmers most especially cattle keepers in order to set up dairy so that the quality and standard level of milk processing must be met in the whole country.

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