



THE RATE OF HIV INFECTION BETWEEN MOTHERS TO CHILD TRANSMISSION IN SPECIALIST HOSPITAL BAUCHI

ABSTRACT

This study “the rate of HIV Infection between mothers to child transmission” was carried out to assist to government, NGOs, corporate bodies to know if the effort geared toward reducing the rate of HIV infection among babies born to HIV positive

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INTRODUCTION

Background of the Study

HIV is a member of group of viruses called Retroviruses. A Retrovirus is a virus that changes itself very rapidly. One reason why HIV is a particularly serious infection is that it attacks and destroys cells of Immune system called T-cells or CD4 cells that are designed to fight infections and diseases.

After HIV penetrates the cells, it takes over their machinery (or programs of the cell) so that it begins to produce many copies of the virus. Eventually, HIV destroys the Immune Cells. Another reason why HIV is very serious infection is that it has the ability to mutate (change itself)



mothers within Bauchi metropolis by the year 2025 and to know the significant relationship between the genders. The research covered the infection of HIV among children aged 0 – 2 years. In this study the data was obtained from medical records library, specialist hospital Bauchi for the year 2012 – 2020. The method used is documentary and it is a secondary data. The time series, regression and correlation methods were used to analyze the data. Based on the analysis, it was found that the rate of HIV infection among children is increasing each year. The fitted model is $Y = 57.6 + 14.1t$, and was used to obtain the trend line. 5 years prediction was made using the above model. There is a significant relationship between the genders as $r = 0.890$ which means no gender is more easily infected with the HIV virus instead, they have equal chance of infection in both sex. It was recommended that government should collaborate with NGOs, religious and traditional Leaders, communication and information involving sanitation public centre and sensitization on preventing of mother to child transmission of HIV. Government and NGOs should educate women on the need of HIV counseling and testing during ANC and Delivery in other to know their status in time to prevent their baby from infection. Seminars and workshops should be regularly carried out in order to update the knowledge of HIV infection on unborn babies among the health personals.

KEYWORD: HIV Infection, Mother to Child, Transmission, Specialist Hospital Bauchi.

rapidly. This makes it especially difficult for researchers to find an effective treatment or vaccine. There are two types of HIV; HIV-1 is responsible for the vast majority of infection and causes of AIDs in the



world. HIV-2 is more common type in West Africa and has slower course than HIV-1.

From the time a person is infected with HIV the virus begins to damage the Immune System. Although an infected person's immune system struggle to fight back, and can do so for as many as 10years or more in an otherwise healthy adult, the virus continues to destroy these defenses until the immune system is too weak to fight off.

A person can be infected and not know because any symptom or illnesses related to HIV may not occur for many years after infection. Most people lead a healthy and productive life after HIV infection; in fact, many people are not aware they are infected because they feel fine. Unfortunately, even if the infected person feels fine, he or she can pass HIV infection on to others.

AIDs is advanced HIV infection, it is the late stage of infection when the immune system is weakened. Advanced infection with HIV weakens the immune system to the point that it cannot fight off infections as effectively as usual. The individual becomes more susceptible to a variety of infections (called opportunistic infections) and other condition (e.g. cancer). Eventually, the infected person may lose weight and become ill with such diseases as persistent severe diarrhea, fever, tuberculosis, pneumonia or skin cancer. People living with AIDs often have multiple infections, although an infected person generally dies as a result of complications of these infections, conditions and malignancies, living with other chronic diseases. No one dies from AIDs or HIV; rather, a person with AIDs dies from an infection or condition that his or her weakened immune systems can no longer fight.

Over the decades, the epidemic, once dominated by infected males have become progressively feminized and in Sub-Saharan Africa approximately 57% of adults living with HIV are women. Over 90% of



infection in children is acquired through mother –to-child transmission (MTCT) and as more women contract the virus, the number of children infected has been growing (PMTCT National Guidelines).

In 2006 alone an estimated 2.3 million children were living with HIV and up to 530,000 were newly infected worldwide, with Sub-Saharan Africa accounting for about 90% of both of these figures.

The rate of mother to child transmission of HIV is affected by many factors. These have been grouped into viral, maternal, obstetric, fetal and breastfeeding factors.

Most children less than 15years living with HIV acquire the infection through Mother-to-child transmission (MTCT). This can occur during pregnancy, Labour and delivery or during breastfeeding. In the absence of intervention, the risk of such transmission is 15-30% in non breastfeeding infected mothers.

The burden of MTCT of HIV is higher in Sub-Sahara Africa than the rest of the world, because of high level of hetero-sexual transmission, high prevalence of HIV in women of reproductive age group, higher proportion of females in reproductive age infected with HIV, high total fertility rate, high rate of prolonged breastfeeding and poor access to effective interventions aimed at preventing MTCT. Transmission of HIV in children has become a critical health problem under mining the positive impact of child survival strategy in the African continent. (PMTCT National Guidelines).

Statement of the Problem

It has been observed that HIV is one of the most prevalent diseases which has claimed millions of lives yearly of which children are affected. Efforts have been made by government, agencies and individuals to roll back HIV. In line with this, it will be of interest to know the rate at which babies born to HIV positive mother's who are



infected with HIV whether it is increasing or decreasing and the relationship between the infected babies in relation to gender in Specialist Hospital Bauchi.

Time series will be a very good tool to ascertain this since the trend of HIV transmission shall be taken over time.

Aims and Objectives of the Study

The aim of this research work is to achieve the following objectives:-

1. To know the rate of HIV infection between Mothers to Child transmission (MTCT) in children recorded over time.
2. To determine the variation in HIV infection recorded over time.
3. To construct regression model to explain the time series behavior overtime for dependent variable (y) and independent variable (x), HIV infection between Mothers to Child transmission (MTCT) and time respectively.
4. To determine the significance relationship between the infected babies in relation to gender.
5. To predict future occurrence of HIV infection between Mothers to Child transmission (MTCT) for the future.
6. To be able to suggest and make recommendation(s) on the way forward on tackling HIV infection between Mothers to Child transmission (MTCT) based on the findings.

Significance of the Study

The significance of this study is to assist government, agencies, stakeholders and the public especially those involved in planning to know if the efforts geared toward preventing of mother to child transmission of HIV is worthwhile within Bauchi metropolis, if not then possible measures will be recommended in tackling the disease as well



as to determine the significant difference between the infected babies in relation to genders.

Hypothesis

H₀: There is no increase of HIV infection from mother to child transmission.

H₁: There is increase of HIV infection from mother to child transmission.

H₀: There is no significance relationship between the infected babies in relation to gender.

H₁: There is significance relationship between the infected babies in relation to gender.

Scope and Limitation of the Study

This study covers only one unit in the specialist Hospital Bauchi (i.e medical Record Library). A documented record was their already. The findings of the study is therefore limited to Specialist Hospital Bauchi, and due to the time constraint as well as inadequate resources, the study do not cover all the environment of the Hospital rather, only the children unit. Therefore, the reliability of the findings shall solely rely on the available data.

Definition of Terms

1. **HIV:** Human immunodeficiency virus:- This is virus that cause AID. HIV infects human cells and uses the energy and nutrients provided by those cells to grow and reproduce.
2. **AIDS:** Acquired immune deficiency syndrome:- Is a disease in which the body is immune (defense) system breaks down and is unable to fight off other infections and concerns.



3. **PMTCT:** Prevention of Mother to Child Transmission: is a program help to reduce the chance of transmission from HIV-positive mothers to their babies.
4. **Forecast:** This is a prediction of future behavior of a variable.
5. **Trend:** This is a long term movement of a variable over an extended period of term.

Method of Data Collection.

The method of data collection used is secondary type of data originated from the existing record of HIV infection for male and female aged 0 – 2years in specialist hospital Bauchi, from medical records library unit for the year (2012 - 2020).

Time Plot.

This is a preliminary analysis in time series where the observation is plotted against time. This reveals the components of time series that is trend, cyclical variation, seasonal variation and irregular variation.

Regression Analysis.

This is a statistical procedure for finding the best prediction equation. The method of least square chooses the prediction line that minimizes the sum of squares of derivation of the observed value from the value of Y.

Forecasting.

The forecast of future occurrence of an event in time series analysis is done by using the pass data in projecting for the future. It is assume that what happen in the pass provide information about what will happen in future.



Forecasting depends on the duration for which are to forecast using the least squares equation $Y = a + bx$ the equation is determine by the behavior of series of data available that conveniently summarize the trend and give logical descriptor.

Simple Correlation Coefficient

This is a statistical method use to determine the relationship between variables. It is used to determine the strength of the relationship.

Pearson correlation Coefficient will be used for the purpose of this research. The range of the correlation coefficient is from -1 to +1. If there is strong relationship the value of r will be close to +1. If there is strong negative relationship the value of r will be close to -1. $r=0$ if there exist no relationship. The relationship is perfect if $r=1$

For short computational formula, the test statistics is

$$r = \frac{n \sum xy - \sum x \sum y}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}}$$

Bluman (2004). Elementary statistic, step by step approach.

Where n is the number of observations.

Assumptions of Correlation

- 1 The mean value of Y are functional dependent on X .
- 2 X and Y are both random variable.
- 3 The relationship between X and Y has a linear pattern, but not possible to interpret the slope of regression of Y on X from correlation coefficient knowledge about r .

Data Presentation

Data for this research work was collected as secondary data transcribed from the records of HIV infection among children born to HIV mothers aged 0 -2 years.



Data Analysis

The analysis of the data was carried out using Minitab package;

Time Plot

The total HIV infection was plot against time which reveals an increase in HIV infection with fluctuation over time.

Regression Analysis.

This method was used to obtain the yearly linear trend model of HIV infection among children in Specialist Hospital Bauchi. The fitted model is

$$Y = 57.6 + 14.1(t)$$

Conclusion

The analysis shows there is high rate of HIV infection between mothers to child transmission hence the trend continue to increase as the slope of the equation is positive.

Forecast

For the purpose of this research, long term forecasting was made; this is said to be forecast for more than a year into future. The projection is calculated in mathematical manner. It is accurate than moving average in forecast.

Five years (2021 – 2025) prediction into future was made using the fitted forecasting model

$Y = 57.6 + 14.1(t)$. The prediction table is in appendix B2 and the prediction graph is in appendix C1.

Simple Correlation Analysis.

Person correlation coefficient was used to determine the degree of relationship between the genders.



It was found that the correlation coefficient is $r = 0.890$, this indicates that there is strong relationship between the genders showing variation in HIV infection between mother to child transmission is the same for the genders.

Test of Significance for r .

$H_0, r = 0$: There is no significance difference between the infected babies in relation to genders.

$H_1, r \neq 0$: There is significance difference between the infected babies in relation to genders

Test Statistics

$$t = r \frac{\sqrt{n-2}}{\sqrt{1-r^2}}$$

$$t_0 = 0.890 \frac{\sqrt{9-2}}{1-(0.890)^2}$$

$$t_0 = 0.926 \frac{\sqrt{7}}{\sqrt{1-0.7921}}$$

$$t_0 = 0.890 \frac{2.6458}{0.4596}$$

$$t = 0.890 \times 5.8027$$

$$t = 5.164 \text{ Computed value}$$

$$DF = 7$$

$$t_{13,5\%} = 1.90 \text{ Critical value.}$$

Decision Rule

Reject H_0 if computed value is greater than critical value and accept otherwise at $\alpha = 0.05$.



Conclusion

Since the computed value is greater than the critical value we reject H_0 and conclude that the relationship is significant between the genders, and the relationship is positively strong.

Discussion of Result

The analysis of data was carried out using Minitab package. The regression analysis was used to obtain the yearly linear trend model of HIV transmission among children born to HIV mother age 0 – 2 years. The result shows that there is high rate of HIV infection between mothers to child transmission hence the trend continue to increase as the slope of the equation is positive. Also simple correlation was used to determine the degree of relationship between the children base on gender it was found out that correlation coefficient it $r=0.890$, this indicates that there is strong relationship between the genders showing no variation in HIV infection between mother to child transmission is the same for the genders.

Summary

With reference to the analysis made in chapter four of this research work it has been observed that: the highest rate of infection among babies in Specialist Bauchi was in 2020 and the lowest was in 2012.

The researcher arbitrarily designated male as x and female as y , since gender is independent of each other.

The model is $Y = a + bx$ i.e $Y = 57.6 + 14.1(t)$ where the slope is 57.6 (a) and the intercept is 14.1(b) respectively.

The relations between the rate of infection among male and female have equal chance of infection since the correlation coefficient $r = 0.890 \approx r=1$, that is as HIV infection increase or decrease in male so



also in female as HIV infection = $57.6 + 14.1(t)$ $t_0 = 5.164$ and the critical value = 1.90 at 5% level of significance.

Conclusion

Based on this research, there is increased in HIV infection between Mothers to child transmission in Bauchi metropolis hence, the slope of the fitting model is positive and the trend kept on increasing.

Also there is exists a strong positive relationship between the genders. Hence the value of r approaches +1. The relationship is significant and no gender is more vulnerable to HIV infection than the other.

The study highlight areas that need to be addressed to minimize the increate rate of transmission between mother to child which is single dose nevirapine at birth, cotrimoxazole for 6weeks and HIV positive mothers to be place on antiretroviral prophylaxis regarding less of their CD4 to suppress the level of the virus to reduce the chance of transmission.

Recommendations

Based on the findings and conclusion from this study (project) the following recommendations are as follows:

1. Government should collaborate with NGOs, religious and traditional Leaders, communication and information involving sanitation public centre and sensitization on preventing of mother to child transmission of HIV.
2. Government and NGOs should educate women on the need of HIV counseling and testing during ANC and Delivery in other to know their status in time to prevent their baby from infection.
3. Seminars and workshops should be regularly carried out in order to update the knowledge of HIV infection on unborn babies among the health personals.



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