EFFECTIVENESS OF PREVENTION OF MOTHER TO CHILD HIV/AIDS TRANSMISSION AT KANDIEGE LEVEL 4 HOSPITAL, KANDIEGE, HOMABAY COUNTY, KENYA

by

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Abstract

Targeted intervention have proven effective in reducing the transmission of HIV from a mother to her unborn child and the infant in developed countries. PMTCT programs are well established in many developing countries. Although it is thought that these programs help reduce transmission of HIV to infants, in Kenya no nationwide study has ever been carried out to support this notion. The number of women in need of PMTCT over the last ten years is estimated at annual average of 80,000.However, this annual need for PMTCT decreased slightly from about 98,000 in 2004 to 79,000 in 2013. This data underscores the need to address epidemic in order to reduce the number of infants exposed to HIV infection. The overall objective of the study was therefore to examine the effectiveness of prevention of mother to child HIV transmission (PMTCT) program. The study adopted a descriptive research design and targeted population was a representative sample of infants born to HIV positive mothers. A representative sample of the aforementioned population was selected using simple random sampling method. Data was collected using structured questionnaire which was administered to hospital administrators. Data collected was checked for errors of omission and commission. Data was then classified, measured, analyzed and interpreted, with respect to the study objectives. Analysis was done using descriptive statistic including measures of central tendency and dispersion. Test of independence (t-test) was carried out to test difference of means. The study determined that prevention of mother to child transmission of HIV PMTCT program at Kandiege level 4 hospital was ineffective at 95% confidence level and so the preventive measures was ineffective.

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 Background of the Problem

Targeted intervention have proven effective reducing the transmission of HIV from a mother to her unborn child and the infant in developed countries. PMTCT programs are well established in many developing countries. Although it is thought that these programs help reduce transmission of HIV to infants, in Kenya no nationwide study has ever been carried out to support this nation [1].

Globally, HIV/AIDS is now the leading cause of mortality among women of reproductive age and contributes a great deal to the death of infants and children. Even in countries that were showing Substantial progress in providing PMTCT interventions, the major challenges that still remain include making sure the interventions are going on smoothly and that they are bringing about the desired outcomes; HIV-free survival for infants and improved maternal and child health [4].

In Sub-Saharan Africa, an estimated 2.3 million children were living with HIV/AIDS in 2010, and an estimated 14.8 million children were orphaned due to AIDS.

In the same year, an estimated 350,000children were newly infected with HIV. Over 90% of these infections occur through mother-to -child transmission [MTCT].
Without effective intervention, half of the infected children wonâĂŹt make it to their second birthday. With effective prevention, the risk of MTCT can be reduced to less than 2%âĂŞ – 5%.But without intervention, the risk of transmission ranges from 20% to 45% [4. 5].

PMTCT refers to a comprehensive management approach aimed at the wellbeing of all women of reproductive age, provision of screening for all women, prevention of new infection among infants born to HIV positive mothers and also provision of management for HIV positive wome PMTCT was given due emphasis in the international HIV/AIDS response as evidenced in many international forums .Among these were the Declaration of

the commitment on HIV/AIDS adopted at the United Nations General Assembly special session on HIV/AIDS in 2001, the Abuja call to Action Towards an HIV- free Generation in 2005, the political Declaration of the United Nations General Assembly High-Level meeting on AIDS to work towards Universal access to HIV prevention, treatment, care and support in 2006, U.S. Global AIDS Coordinator PMTCT expert panel in 2009 and numerous other high level statements by multilateral organization [6].

Achievements in PMTCT Progress were significant in many countries. The 2009 Universal Access Report states that in 2005 there were 34 countries that had established a national PMTCT Expansion plan that includes population based targets and the number of countries has increased then to 70 of 123 reporting low- and middle-income countries[6].There also have been strong progress in re- ducing the HIV Incidence among children younger than 15 years in Sub-Saharan Africa .The estimated 350,000 children who were newly infected with HIV in 2010 in Sub-Saharan Africa were 30% fewer than the 500,000 who acquired HIV infection in 2001. Fewer children are dying from AIDS related causes from an estimated 320,000 in 2005 to 230,000 in 2010.

According to the 2011 strategic vision for elimination of vertical transmission of HIV, ten high burden countries of Sub Saharan Africa account for two-thirds of all mother-to-child transmission infections [MTCT].

Mother to child transmission can occur during pregnancy, at birth or during infancy and childhood. The main time of transmission is presumed to be at and around birth when there will be separation of placenta from the uterine wall rendering contact between maternal and fetal blood possible, and during birth when the fetus passes through the vagina canal. Kourtis and group in 2001 suggested that half of the transmission occurs at labour. The estimates are based on a hypothetical cohort of 100 children born from HIV positive mother that did not receive any prophylaxis [7]

The diagnosis of HIV infection remains difficult because the mother passes antibodies to the child which will remain in the fetal circulation for a period of up to eighteen months .The signs and symptoms infected children exhibit are different from adults and at times they may show no manifestations at all [8]. An important method for diagnosing HIV in children is polymerase chain re-action (PCR) test, for virus in an HIV exposed infant's

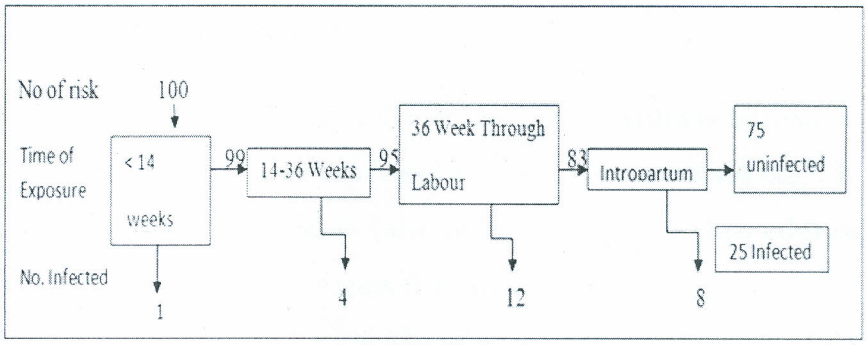

Figure 1.1: Estimation of timing of pre-natal HIV transmission rates

blood cells. This test involves the detection of viral antigen from a blood sample collected from HIV exposed infants [9] In line with the international standards for a comprehensive strategy, the PMTCT policy recognizes that in order to prevent HIV among women and children the four elements of PMTCT are integral. These include:

- Primary prevention of HIV, especially among women of child bearing age.
- Preventing unintended pregnancies among women living with HIV.
- Preventing HIV transmission from a woman living with HIV to her infants, and
- Providing appropriate treatment, care and support to women living with HIV and their children and families.

The magnitude of the pandemic of human immunodeficiency virus (HIV) infection in developing Countries is such that multiple approaches are required to show its spread and alleviate the burden on health the sector and society in general.[10]

Primary prevention of HIV transmission remains a key component of HIV/AIDS programs, and should be led by Governments and donor agencies [11]

Women of child bearing age constitute nearly half of the over 40 million adults currently living with HIV/AIDS world-wide [12] The increasing number of the infected women and children has implications for both organizations of equitable and sustainable health care and prevention of vertical transmission.

1.2 Statement of the Problem

The Number of women in need of PMTCT over the last ten years is estimated at an annual average of 80,000. However, this annual need for PMTCT decreased slightly, from about 98,000 in 2004 to 79,000 in 2013. This data underscores the need to address epidemic in order reduce the number of infants exposed to HIV infection.

This study therefore seeks to examine the effectiveness of prevention of mother to child HIV/AIDS transmission at Kandiege level 4 Hospital, Kandiege Homa-Bay.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of the study was to examine the effectiveness of prevention of mother to child HIV/AIDS transmission.

1.3.2 Specific Objectives

The specific objectives of the study were to:-

1. Determine the effect of medical intervention on the HIV status of the infants born to HIV positive pregnant mothers.
2. Determine how early diagnosis of a pregnant woman's HIV status can help in the prevention of mother to child transmission of HIV.

1.4 Significance of the Study

This study will assist the public health sector and other stakeholders in the Ministry of Health to understand the effectiveness of prevention of mother to child HIV/AIDs transmission (PMTCT) programme at Kandiege level 4 Hospital in Homa Bay County.

This study will also form a basis for future research in the academic field.

1.5 Notations and other Definitions

HIV — Human Immunodeficiency Virus.

AIDS — Acquired Immunodeficiency syndrome.

CD4 — Are suppressor or killer symptoms. Antibodies are proteins that destroy or neutralize foreign substances, such as pathogens in the body.

Pathogens — Organisms that causes diseases.

Prevalence of a disease — Is the fraction of the population infected.

The incidence of a disease — Is the rate at which infections occur.

Immune system — Is the organs and cells in the body that protects it from most pathogens it encounters and helps one from becoming ill.

Incubation period — The duration from the time of HIV infection to be- coming full blown AIDS.

WHO — World Health Organization.

HEI — HIV Exposed Infant.

DBS test — Dried Blood Spot.

PCR — Polymerase Chain Reaction.

PMTCT — Prevention of Mother-to-Child Transmission of HIV.

MTCT — Mother-to-Child Transmission of HIV.

ANC — Antenatal Care.

VCT — Voluntary Counseling and Testing.

HAART — Highly Active Antiretroviral Therapy.

CHWâĂŹS — Community Health Workers.

AZT — Zidlovudine.

CHAPTER 2

LITERATURE REVIEW

2.1 Geographical Location of Homa Bay County

Homa Bay County is located in Western Kenya. It borders Migori County to the South, Kisii County and Nyamira County to the South-East, Kericho County to the East, Kisumu County to the North and lake Victoria to the North and North- West.

According to the 2009, Kenya Population and Housing census, it has a population of 963,794 with a population density of 303 people per Km^2 and annual growth rate of 2.7%. Age distribution is 0–4 years 48.1%, 15–64 years 48.2% and 65 years 3.7% and it covers an area of $3,183.3Km^2$.

Homa Bay County has 164 health facilities with 4 district hospitals, 7 sub-district hospitals, 88 dispensaries 38 health centers, 14 medical clinics,7 VCT centers and one privately owned institution.

The major economic activity is fishing and fish processing with the County being the leading supplier of fresh water Fish in the Country. This is due to its proximity to Lake Victoria with 80% of its water in the County.

2.2 The County Prevalence Rate

Homa Bay County has been ranked at the first position with a prevalence rate of 25.7%. More than 19.000 Children in the County are infected with HIV and HIV infection has been declared a disaster

HIV is most often transmitted from a Mother to her Child during pregnancy delivery and Breast feeding is crucial for Children's survival, growth and development providing antiretroviral medicines to Mother throughout the breast feeding period is critical to significantly reducing Mother to Child transmission rates.

There is no cure for HIV infection. Early infant diagnosis is critical, however, when ART is administered as early as possible in the course of infection, it can help Children

living with HIV lead longer, Healthier lives, Taken every day these Medicine can drastically reduce the concentration of HIV in the blood stream and increase levels of CD4 cells, thereby slowing the progression of the disease [1].

2.3 Estimated Need for PMTCT

The number of Women in need of PMTCT over the last 10 Years is estimated at an annual average of 80,000.However, this annual need for PMTCT decreased slightly from about 98,000 in 2004 to 79,000 in 2013

This data underscore the need to address epidemics in order to reduce the number of infant exposed to HIV infection.

2.4 Early Infant Diagnosis

Early infant diagnosis especially within 2 months is a key strategy for reducing the risk of PMTCT, over the last 3 Years Kenya scaled up infant diagnosis to reach 45% of infant annually by 2013 ,However, the early infant diagnosis still remain low and there is need to scale up strategies to be put in place.

According to the study conducted by Elizabeth Glaser pediatric AIDS Foundation, EGPAF, only 8000 Children have been identified and introduced to ARVS.

2.5 Method of Feeding

HIV is found in breast milk and if one breast feeds the chance of passing the virus to the baby is high. However, studies conducted in south Africa, it was concluded, that the transmission rate of the virus depends on how long the infant if fed (27) replacement feeding is considered the best option and is 100% recommended.

A randomized trial in Kenya (2001) indicated that children who were fed with formula were free of HIV at two years. If one lives in area where safe water is not available, the risk of life threatening conditions from a formula feeding may be higher than risk from breast feeding (29) mixed feeding should be avoided completely in the first six months. This is when the infant is fed with both breast milk and other liquids such as formulas.

This is because the Immune system of the child is not well developed, and may result in recruitment of white of white blood cells into the gastrol intestinal tract, providing additional target for HIV infection (27).

Some research work that have been done in this area include:

(Nafisa, 2011) studied HIV-1 Drug persistence emergence among Breast feeding infants âĂŞArm trial of triple âĂŞAntiretroviral prophylaxis to prevent mother to child HIV transmission through breast feeding study, Kenya A clinical trial (14).

(Avinen, 2010), studied male participation and prevention of Human immunodeficiency virus (HIV) mother to child transmission in Africa (15)

(Vora 2010) studied Breast feeding and the risk of malaria in children born to HIV-infected and uninfected mothers in rural Uganda (16)

(Mugisia and Luboobi, 2003) Modeled the effect of vertical transmission in the dynamic of HIV/AIDs in the age structured population models for the dynamic of HIV/AIDs are of importance in understanding the actual impact the spread has on a particular age group of interest. (17)

(Kgosimore and Lungo, 2006) modeled the spread of HIV/AIDs in the application of treatment and vaccination with different levels of vaccine efficacy (18).

(Dube, 2008) studied estimating vertically acquired HIV infections and the impact of the prevention of mother to child transmission program in Zimbabwe (19)

(Khamadi, .2008) studied rapid identification of infants for antiretroviral therapy in a resources poor setting: The Kenya experience (20)

(A houa, 2010) studied evaluation of a 5-years program to prevent mother to child transmission of HIV infection in Northern Uganda (21)

(Nyandiko, 2011) studied outcome of HIV-Exposed children in Western: Efficacy of prevention of mother to child transmission in a resource- constrained setting, Kenya (22)

(Bancheno, 2010), studied outcomes and challenges of scaling up comprehensive PMTCT services in rural Swaziland, Southern Africa (23)

(Biribonwoha, 2010) studied introducing a multi-site program for early diagnosis of HIV infection among HIV-Exposed infants in Tanzania (24)

(Chibwesha, 2011) studied optimal Time on HAART prevention of mother to child

transmission of HIV in Zambia (25)

(Lettow, 2011) studied uptake and outcomes of a prevention of mother to child transmission PMTCT programme in Zomba, Malawi (28).

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Design

Descriptive survey design was adopted in carrying out this study.

3.2 Study Area

The study was confined to Kandiege level 4 Hospital, Kandienge, in Homa-Bay County. Kandiege Level 4 Hospital is a ministry of Health sub-District Hospital located in Kojwang, Koyugi location, west Karachuonyo constituency in Homa Bay County.

The sub District hospital has 36 beds, opens on weekends and operate 24 hours a day, services includes antiretroviral therapy, family planning, home based care etc. the facility is coded 13653.

3.3 Target Population

The study targeted 60 women and infants enrolled in PMTCT program, and 60 women and infants not enrolled in PMTCT program in Kandiege level 4 Hospital, Kandiege, Homa-Bay County between January 2010 December 2013.

3.4 Sampling and Sampling Procedure

Using the formula by Yamane (1967).

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

Where n is the sample size, N is the population, e is the level of precision (Yamane, 1967).

A sample size of 60 infants enrolled in PMTCT program and 50 infants not enrolled in PMTCT program was studied.

A simple random sampling was used to draw a large enough sample for the study.

3.5 Data Collection Tools

A structured questionnaire was used to collect the information from the patients folders, the questionnaires were issued to the Hospital Administrators at Kandiege Health Center.

3.5.1 How Data Collection Was Done

All the folders of mothers who met the criteria for inclusion into the study were one retrieved and reviewed by hospital Administrators and data collected including demographic characteristics, antiretroviral prophylaxis, given to the infant feeding option chosen for the child and the status of the child after eighteen months were also collected. The data collection was done between February and April 2014.

3.6 Hypothesis Test for Difference Between Two Means

Let μ_p represents the population mean of HIV negative infants enrolled in PMTCT program and μ_{Np} represents the population mean of HIV negative infants not enrolled in PMTCT program

3.7 Hypothesis Statement

$$H_0 : \mu_p = \mu_{Np}$$

$$H_1 : \mu_p \neq \mu_{Np}$$

3.8 Procedure to Test a Null Hypothesis about Differences

Let Yp represents total number of HIV negative infants enrolled in PMTCT program YNp represents the total number of HIV negative infants not enrolled in PMTCT program.

(i) $\overline{Y}p$ â Ĺ Š – $\overline{Y}Np$ is a good estimate of the different in the population means μp – â Ĺ Š μNp.

(iii) $\overline{Y}p$ and $\overline{Y}Np$ are subject to sampling variation as in the different $\overline{Y}p$âĹŠ $-\overline{Y}Np$

(iv) We will need an estimate of the standard deviation of $\overline{Y}p$âĹŠ $-\overline{Y}Np$.

We want to know if under the null hypothesis the r.v $\left[\overline{Y}p - \text{âĹŠ}\overline{Y}Np\right] - 0$, the difference between the differences in sample mean and the null - hypothesized difference between the population means, is likely to be as large as the observed actual difference between the sample means our particular sample and the null-hypothesized difference between population means.

3.8.1 The Hypothesis Test

A test statistic for the difference between the difference is sample means and the null-hypothesized difference in population means.

$$t = \frac{\left(\overline{Y}p - \overline{Y}Np\right) - \text{âĹŠ}o}{SE\left(\overline{Y}p - \text{âĹŠ}\overline{Y}Np\right)} \tag{3.1}$$

This tests statistic is distributed $N(0,1)$ if the two samples are reasonably large. If the test statistic is (bigger than 1.96), then we reject the null-hypothesis, why? The actual difference in sample means is unlikely to be as big as it is if the null were true. Standard error of the difference in sample means

$$SE\left(\overline{Y}p\text{âĹŠ} - \overline{Y}Np\right) = \sqrt{\frac{S_p^2}{np} + \frac{S^2N_p}{nNp}} \tag{3.2}$$

S^2p, sample variance for infants enrolled in PMTCT program

$$S^2p = \frac{1}{N_p - 1}\sum_{j=1}^{np}\left(Y_j - \overline{Y}N_p\right)^2 \tag{3.3}$$

S^2Np, sample variance for infants not enrolled in PMTCT program

$$S^2Np = \frac{1}{nN_p - 1}\sum_{j=1}^{nNp}\left(Y_j - \overline{Y}N_p\right)^2 \tag{3.4}$$

3.9 Ethical Considerations

Written, signed, informed consent for all procedures in the study was obtained from Kandiege Health Centre Hospital administrators and health staff for data extraction from the patient folders.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Results

Table 4.1: INFANTS ENROLLED IN PMTCT PROGRAM(2010—2013)

YEAR	JAN		FEB		MAR		APRIL		MAY		JUNE		JULY		AUG		SEP		OCT		NOV		DEC		TOTAL		
MONTH		-		-		-		-		-		-		-		-		-		-		-		-		-	
2010	1	1	0	1	0	1	0	1	1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	2	11	13
2011	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	1	1	1	1	1	2	11	13
2012	1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	1	1	11	12
2013	0	1	0	1	0	1	0	1	0	1	1	1	0	1	0	1	0	1	0	1	0	1	0	0	1	11	12
	2	4	0	4	0	4	0	4	1	4	1	4	0	4	0	4	0	3	0	4	1	3	1	2	6	44	50

Table 4.2: INFANTS NOT ENROLLED IN PMTCT PROGRAM(2010—2013)

YEAR	JAN		FEB		MAR		APRIL		MAY		JUNE		JULY		AUG		SEP		OCT		NOV		DEC		TOTAL		
MONTH		-		-		-		-		-		-		-		-		-		-		-		-		-	
2010	1	1	1	1	1	0	1	0	1	1	1	0	1	0	1	0	0	0	1	0	0	0	1	0	10	3	13
2011	1	1	0	1	1	0	1	0	2	0	1	0	1	0	1	0	2	0	0	0	0	1	0	0	10	3	13
2012	0	0	2	0	1	0	1	0	1	0	0	0	0	0	2	0	1	1	1	0	1	0	0	1	10	2	12
2013	1	0	1	0	0	0	2	1	0	0	1	0	0	0	0	1	0	0	1	0	2	0	2	0	10	2	12
	3	2	4	2	3	0	5	1	4	1	3	0	2	0	4	1	3	1	3	0	3	1	3	1	40	10	50

Figure 4.1: Infants Enrolled in PMTCT Program(2010—2013)

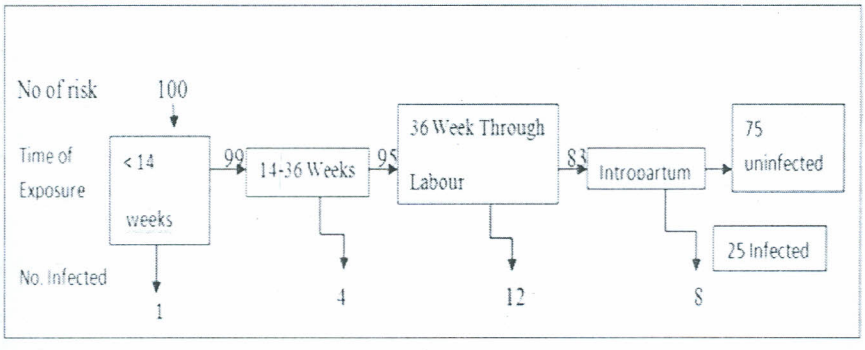

Figure 4.2: Estimation of timing of pre-natal HIV transmission rates

Descriptive Statistics

	N	Sum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Number of HIV Positive Infants in 2010	12	10	.83	.112	.389	.152
Number of HIV Negative Infants 2010	12	3	.25	.131	.452	.205
Number of HIV Positive Infants in 2011	12	10	.83	.207	.718	.515
Number of HIV Negative Infants 2011	12	3	.25	.131	.452	.205
Number of HIV Positive Infants in 2012	12	10	.83	.207	.718	.515
Number of HIV Negative Infants 2012	12	2	.17	.112	.389	.152
Number of HIV Positive Infants in 2013	12	10	.83	.241	.835	.697
Number of HIV Negative Infants 2013	12	2	.17	.112	.389	.152
Valid N (listwise)	12					

Figure 4.3: SPSS Analysis of Infants Not Enrolled in PMTCT Program(2010—2013)

4.1.1 Analysis of Data for Infants Enrolled in PMTCT

(i) Monthly Sample mean for positive infants enrolled in PMTCT

$$\begin{aligned} \overline{Y}p &= \frac{\sum Y_j}{N} \\ &= \frac{06}{12} \\ &= 0.5 \end{aligned} \tag{4.1}$$

(ii) Monthly Sample variance for HIV positive infants enrolled in PMTCT

$$\begin{aligned} S^2p &= \frac{1}{n_p-1}\sum_{i=1}^{np}\left(Y_i - \overline{Y}_p\right)^2 \\ &= \frac{1}{12-1}\sum_{i=1}^{12}\left(Y_i - 0.5\right)^2 \\ &= \frac{3}{11} \\ &= 0.2727272727 \end{aligned} \tag{4.2}$$

(iii) Monthly Standard deviation for HIV Positive infants enrolled in PMTCT

$$\begin{aligned} Sp &= (S^2p)^{\frac{1}{2}} \\ &= \left[\frac{1}{n-1}\sum_{i=1}^{np}\left(Y_i - \overline{Y}p\right)^2\right]^{\frac{1}{2}} \\ &= (0.2727272727)^{\frac{1}{2}} \\ &= 0.522232967 \end{aligned} \tag{4.3}$$

(iv) Monthly Sample mean for HIV negative infants enrolled in PMTCT

$$\begin{aligned} \overline{Y}p &= \frac{\sum Yi}{N} \\ &= \frac{44}{12} \\ &= 3.6666666 \end{aligned} \tag{4.4}$$

(v) Monthly Sample variance for HIV negative infants enrolled in PMTCT

$$\begin{aligned} S^2p &= \tfrac{1}{np-1}\textstyle\sum_{i=1}^{np}\left(Yi-\overline{Y}p\right)^2 \\ &= \tfrac{1}{12-1}\textstyle\sum_{i=1}^{12}\left(Yi-3.6666666\right)^2 \\ &= \tfrac{14.666666666}{11} \\ &= 1.333333333 \end{aligned} \tag{4.5}$$

(vi) Monthly Standard deviation for HIV negative infants enrolled in PMTCT.

$$\begin{aligned} S_p &= (S^2p)^{\frac{1}{2}} \\ &= \left[\tfrac{1}{np-1}\textstyle\sum_{i=1}^{12}\left(Yi-\overline{Y}p\right)^2\right]^{\frac{1}{2}} \\ &= (1.33333333)^{\frac{1}{2}} \\ &= 1.154700538 \end{aligned} \tag{4.6}$$

4.1.2 Analysis of Data for Infants not Enrolled in PMTCT

(i) Monthly Sample mean for HIV positive infants not enrolled in PMTCT

$$\begin{aligned} \overline{Y}Np &= \tfrac{\sum Yi}{N} \\ &= \tfrac{40}{12} \\ &= 3.333333 \end{aligned} \tag{4.7}$$

(ii) Monthly Sample variance for HIV positive infants not enrolled in PMTCT

$$\begin{aligned} S^2Np &= \tfrac{1}{nNp-1}\textstyle\sum_{j=1}^{nNp}\left(Y_j-\overline{N}p\right)^2 \\ &= \tfrac{1}{12-1}\textstyle\sum_{j=1}^{12}\left(Y_j-3.3333\right)^2 \\ &= \tfrac{20.6666}{11} \\ &= 1.878787878 \end{aligned} \tag{4.8}$$

(iii) Monthly Standard deviation for HIV positive infants not enrolled in PMTCT

$$\begin{aligned} SNp &= \left[\frac{1}{nNp-1}\sum_{j=1}^{nNp}\left(Y_j - \overline{Y}Np\right)^2\right]^{\frac{1}{2}} \\ &= (S^2Np)^{\frac{1}{2}} \\ &= (1.878787878)^{\frac{1}{2}} \\ &= 1.37068833 \end{aligned} \tag{4.9}$$

(iv) Monthly Sample mean for HIV negative infants not enrolled in PMTCT

$$\begin{aligned} \overline{Y}Np &= \frac{\sum Y_i}{N} \\ &= \frac{10}{12} \\ &= 0.8333 \end{aligned} \tag{4.10}$$

(v) sample variance for HIV negative infants not enrolled in PMTCT

$$\begin{aligned} S^2Np &= \frac{1}{nNp-1}\sum_{j=1}^{nNp}\left(Y_j - \overline{Y}Np\right)^2 \\ &= \frac{1}{12-1}\sum_{j=1}^{12}\left(Y_j - 0.83333\right)^2 \\ &= \frac{19.66666666}{11} \\ &= 1.7878787878 \end{aligned} \tag{4.11}$$

(vi) Monthly Standard Deviation for HIV negative not enrolled in PMTCT

$$\begin{aligned} SNp &= \left[\frac{1}{nNp-1}\sum_{j=1}^{nNp}\left(Y_j - \overline{Y}Np\right)^2\right]^{\frac{1}{2}} \\ &= (S^2Np)^{\frac{1}{2}} \\ &= (1.7878787878)^{\frac{1}{2}} \\ &= 1.337115847 \end{aligned} \tag{4.12}$$

Standard error of the difference in sample means of HIV positive infants.

$$\begin{aligned} SE\left(\overline{Y}p - \overline{Y}Np\right) &= \sqrt{\frac{S^2p}{np} + \frac{S^2Np}{nNp}} \\ &= \sqrt{\frac{0.272727272}{12} + \frac{1.878787878}{12}} \\ &= \sqrt{\frac{2.15151515}{12}} \\ &= 0.423429957 \end{aligned} \tag{4.13}$$

Standard error of the difference in sample means of HIV negative infants.

$$\begin{aligned} SE\left(\overline{Y}p - \overline{Y}Np\right) &= \sqrt{\frac{S^2p}{np} + \frac{S^2Np}{nNp}} \\ &= \sqrt{\frac{1.333333333}{12} + \frac{1.7878787878}{12}} \\ &= \sqrt{\frac{3.12121212}{12}} \\ &= 0.510000 \end{aligned} \tag{4.14}$$

The hypothesis test

A test statistic for the difference between the difference in sample means and the null-hypothesized difference in population means.

Returning to our test statistic for HIV negative infants

$$\begin{aligned} t &= \frac{\left(\overline{Y}p - \overline{Y}Np\right) - d0}{SE\left(\overline{Y}p - \overline{Y}Np\right)} \\ &= \frac{(3.6666 - 0.83333) - 0}{SE\left(\overline{Y}p - \overline{Y}Np\right)} \\ &= \frac{2.83333}{0.51000} \\ &= 5.5555 \end{aligned} \tag{4.15}$$

This is a very large t-statistics (a t-statistic of 1.96 is all that is required to reject the null hypothesis.)At 95% confidence interval the value of z is 1.96 so we reject the null hypothesis of equal number of HIV negative infants between infants enrolled in PMTCT and those not enrolled in PMTCT program with very high confidence.

4.1.3 Discussion

In the study all the fifty positive mothers who were enrolled in PMTCT program were monitored received treatment either during the course of their pregnancy or at the onset of labour unlike the fifty positive mothers who were not enrolled in PMTCT program.

All the fifty infants born to HIV positive mothers who were enrolled in PMTCT program also received medications. These medications helped reduce the transmission of the virus from the mother to child.

From the study, only six infants out of fifty infants enrolled in PMTCT program tested positive for HIV after 18 months while forty tested positive out of fifty infants who were not enrolled in PMTCT program. This showed that providing antiretroviral medicines to mothers and infants had some effect in reducing mother-to child transmission rates.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This study intended to evaluate the effectiveness of PMTCT program by comparing the status of infants born to HIV positive pregnant mothers enrolled in PMTCT program to infants born to HIV positive pregnant mothers who were not enrolled in PMTCT program. A representative sample of 50 infants picked at random from a target population of 60 infants using sampling formula by Yamane (1967) were considered in each case.

5.2 Summary

The study sought to examine the effectiveness of prevention of mother to child HIV/AIDS transmission at Kandiege level 4 Hospital, Kandiege, Homa Bay County. To achieve this, one objective was pursued. The objective sought to determine the effect of medical intervention on the HIV status of the infants born to HIV positive pregnant mothers.

A representative sample of fifty infants selected at random from a target population of sixty infants using sampling formula by Yamane (1967) were considered in each case.

From the study, only six infants out of fifty infants enrolled in PMTCT program tested positive for HIV after 18 months whereas forty tested positive out of fifty who were not enrolled in PMTCT program. Based on this objective, the study established that at 95% confidence interval, the effect of medical intervention on the HIV status of the infants born to HIV positive pregnant mothers was minimal.

5.3 Conclusion

Based on the objective of the study, it was established that prevention of motherâĂŞtoâĂŞchild HIV/AIDS transmission at Kandiege level Hospital between 2010-2013 was ineffective at 95% confidence level and so the preventive measures were ineffective.

5.4 Recommendation

The finding of the study has shown that medical intervention has minimal effect in the prevention of mother to child HIV/AIDS transmission on the HIV status of the infants born to HIV positive pregnant mothers .The study therefore recommends that new vaccine and drugs be developed to deal with the problem of prevention of mother to child HIV/AIDS transmission since mothers could have developed resistance to the ART drugs administered.

5.4.1 Suggestion for Further Research.

First, the study recommends that future research that will embrace a case study design be carried out to examine the effectiveness of prevention of mother-to-child HIV/AIDS transmission.

Second, it is suggested that future research employs a larger sample and make use of other data collection methods such as interviews so as to confirm research findings established in this study.

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