

HIV among Under-Five Children in Lubuto an Urban Population Setting of Ndola, Zambia; Prevalence and Related Factors

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ABSTRACT

Background: As of 2014, the perseverance rate of infants contracting HIV among children born to mothers infected with HIV in Zambia was 5.5%, with an estimate of 25 new child infections occurring each day. Showing that the burden of paediatric HIV is unacceptably high. Prevention of mother-to-child transmission (PMTCT) of HIV represents a critical opportunity for reducing the burden of paediatric HIV. The objective of this study was to determine the prevalence of HIV among under five children in Lubuto an Urban Population setting and find out factors associated with this prevalence. **Method:** The study was a cross-sectional study. Data was collected using standardized questionnaire from mothers with under-five children. It was entered and analysed using SPSS. Proportions of various variables were compared using the Chi-square test and only results yielding p value of less than 0.05 were considered to be of statistical significance. **Results:** There was a total of 361 mothers interviewed, representing 357 singletons and 2 sets of twins. The prevalence rate among Under-fives in Lubuto was 4.7%. None of the risk factors studied, namely: (a) maternal age, (b) level of mother's education, (c) place of delivery, (d) who delivered, (e) mode of delivery and type of feeding practices, were associated with HIV.

Conclusion: The prevalence rate among under-five children was slightly below the target of the Zambia National AIDS Strategic Framework 2014-2016 which aims at reducing the risk of MTCT of HIV to less than 5% by the end of the breastfeeding period by 2016.

Key words: Prevalence, HIV, Factors, Under-Five Children, Zambia.

Introduction

Acquired Immunodeficiency syndrome (AIDS), is caused by Human Immunodeficiency Virus (HIV) a member of Lentivirus genus, Retroviridae family (slowly replicating retrovirus), a condition in humans in which there is progressive failure of the immune system allowing life-threatening opportunistic infections and cancers to thrive [1,2]. Globally, it's estimated that more than two million infants of HIV-infected pregnant mothers are exposed to HIV annually [3]. Two hundred and fifty thousand children died of AIDS-related illnesses in 2010 alone [3]. The 2015

UNAIDS global Factsheet report however records that, there has been a decline of new infections among children by 50% since 2010 [4]. However, despite the reduction on the global infection rate, the children living in the sub-Saharan Africa are still affected at more than 90% [4]. It is also documented that more than 91% of HIV infected infants in Africa acquire the infection from their mothers during pregnancy, at the time of delivery, or postnatally through breastfeeding [5]. It has also been found that transmission rates of HIV are consistently higher in resource-poor countries than in industrialised countries [6], while the developed countries recording very low transmission rates of <2% [7,8]. In Nigeria for example, the reported transmission rates are between 4-16% following the use of antiretroviral (ARV) drugs and safe obstetric practices [9]. Zambia has one of the highest HIV burdens in Sub-Saharan Africa. According to the 2007 Demographic and Health Survey (DHS), the estimate

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of HIV prevalence among adults aged 15-49 was at 14.3%. With females having highest at 16.1% compared to males 12.3% [10]. In 2009, the HIV prevalence rate from the data collected from the 21 antenatal sentinel surveillance sites indicated the mean site of 16.3% among pregnant women ranging 15-44 of age [11]. Studies also show that, HIV transmission rate from mother to child, including during breastfeeding declined from 24% in 2009 to 12% in 2012. This represented a 51% decrease in the number of new HIV infections among children between 2009 and 2012 [10]. There was also an observed decline from 19,000 in 2009 to 11,000 in 2011 and to 9,500 in 2012 concerning new HIV infections among children (0-14 years old). Surprisingly, there was an increase from 21% in 2010 to 57% in 2012 in the percentage of children tested for HIV at two months of age [10]. UNAIDS in 2011 launched in twenty-two priority countries where 90% of the world's HIV-infected pregnant women reside, a global plan to eliminate new paediatric HIV infections by 2015 [12]. As a result, the World Health Organization (WHO) revised their 2006 guidelines for the elimination of mother-to-child HIV transmission (eMTCT) in developing countries. Specifically, in 2010 WHO recommended that HIV-infected pregnant women eligible for antiretroviral therapy (ART) receive lifelong therapy, while ART ineligible women receive one of two antiretroviral (ARV) prophylactic regimens (Options A or B) to prevent MTCT during pregnancy and breastfeeding [13]. In addition, for the first time, ARVs to prevent MTCT during breastfeeding were recommended in settings where breastfeeding is the safest feeding option. In 2013, however, WHO updated their guidelines again, recommending that all pregnant women, regardless of clinical stage, receive ART at a minimum during pregnancy and breastfeeding (Option B) or ideally lifelong (Option B+) [14]. PMTCT option B+ makes the elimination of mother to child transmission much simpler and more effective: all positive pregnant women receive treatment immediately and for life regardless of CD4 count and all infants are provided with one pill, once a day from birth through four to six weeks regardless of the feeding method [10]. Zambia changed the PMTCT implementation model from PMTCT option A to Option B+ in 2013 soon after WHO updated their guidelines [10]. Thus, with option B+ implemented, it was likely to have a greater impact in reducing infant HIV infections, increasing maternal survival and reducing transmission to HIV negative male sexual partners than the former eMTCT program (option A) and option B. These benefits will have a continuing positive impact in the future, both during future

pregnancies and in protecting HIV-negative male partners. Option B+ has therefore been considered the best available method to eliminate MTCT. Since the implementation of the Option B+ strategy in 2013, no information is available in Ndola and most of the Zambian Cities that has been published to show how the status of the prevalence rate is currently. In this study, we aim to estimate the prevalence of HIV among under five children in Lubuto, Ndola and also find out some of the factors associated with this infection.

Methods

Study area and population

The study population were Children below the age of 5 years and below in Lubuto urban area of Ndola City. Lubuto is one of the biggest suburbs in the city of Ndola with its local health centre, Lubuto Clinic having a catchment area of about 48,550 of which 6,865 are children under-five children as of 2015. It is a good representation of most of the typical Zambian urban district, as it accommodates the middle and low Economical income families, and the vast multicultural and large population makes a suitable study population as it in parts represents Ndola as a whole.

Study design

The study design was a cross-sectional study looking at the prevalence rate and some of the factors affecting the prevalence rate of HIV among children under the age of five. It was a questionnaire based study targeting mothers with under-five children.

Ethical considerations

Ethical approval was obtained from the Health Research and Ethics Committee of Tropical Diseases Research Centre (TDRC) Ethical Committee. The names of all the study subjects were coded in the final soft and hard copies of the questionnaire to ensure confidentiality.

Sample size and sampling

A Statcalc program in EPI INFO version 6.04 was used to estimate the sample size with the following parameters in Lubuto (total sample population size of 6,865 children under five. level of confidence (z) 1.96 at 95% confidence level, marginal error of 5% and baseline levels of indicators 50% as no estimates existed) of the 6865 participants 363 were selected. From the sample sizes all the mothers were systematically randomly selected using the formula $1/k$ where k is the sample size.

Data collection

Mothers of study subjects gave their verbal consent. Data was collected through the use of a standardized questionnaire for each mother, the questions aimed at gathering information regarding the prevalence rate and factors affecting it.

Definitions of variables

A standardized questionnaire was developed from some questionnaires that had been previously used in similar studies.

Prevalence was determined by finding out from the mother the status of the age, sex and status of the under-five child.

Risk factors:

Demography of Mother was determined by asking questions which included, the age, education level and status of the mother.

Possible Risk Factors

In addition to this, antenatal visits and services offered where asked, to this end, the place and mode of delivery was asked. Lastly, the mode of feeding after deliver was asked.

Data management and analysis

Data was entered through the use of epi data software .The data entry was screened in terms of consistency and was double entered. The data was then transferred to SPSS. Thus statistical analysis was performed using SPSS and χ^2 tests were used to evaluate associations between dichotomous variables, and a result yielding a p value of less than 5% was considered statistically significant.

Results

The prevalence rate of HIV among under-five children in Lubuto, Ndola was found to be 4.7%. From the 361 sample population, 16 children were found to be HIV positive. Which represented the prevalence rate of 4.7 %. From the 16 under-five children found positive, Eleven (11) were diagnosed positive by age of two months representing 68.75%.Two (2) where diagnosed positive by 7th month of age representing 12.5%. The remaining three were diagnosed at 24th, 28th and 36th month of age respectively and each representing only 6.25%.The major form of diagnosing was DNA PCR technique accounting for 81.25%. With the resting being clinical then confirmed positive by serology.

Table 1: Distribution of the prevalence between sex and age

Factors	Positive n (%)	Negative n (%)	Unknown n (%)	Total n (%)	P value
Sex of patient					
Female	9 (56.2)	160 (49.2)	11 (55.0)	180 (49.9)	0.524
Male	7 (43.8)	165 (50.8)	9 (45.0)	181 (50.1)	
Age (years) of patient					
0- 1.9	11 (68.8)	214 (65.8)	16 (80.0)	241 (66.8)	0.811
2- 4.9	5 (31.2)	111 (34.2)	4 (20.0)	120 (33.2)	

From 361 mothers interviewed, 191(52.9%) mothers where negative, 69 (19.1%) were positive and 101 (28.0%) did not know their status or they had tested more than three months prior the interview. There were 69 babies delivered to the 69 HIV-infected mothers, comprising only of singletons, with no twins recorded.

Table 1 shows that, the 16 children who were positive, 9 (56.2%) were females and 7 (43.8%) were males giving a ratio of Female: male of 1:1.1. p= 0.524. It was found that HIV infected children, 11 (68.8%) are between 0-1.9 years while 5 (31.2%) were between 2 and 4.9 years, p=0.811.

Table 2: Factors associated with the prevalence of HIV among Under-five

Factors	Case n (%)	Control n (%)	Total n (%)	P value n (%)
Age of Mother	9 (56.2)			
15-25 years	7 (43.8)	153 (47.1)	162 (47.5)	0.473
Over 25 years		172 (52.9)	179 (52.5)	

Edu of Mother	6 (37.5)			
None-primary	10 (62.5)	128 (39.4)	134 (39.3)	0.880
Secondary & Tertiary		197 (60.6)	207 (60.7)	

As seen in table 2, 9 (56.2%) positive children come from mother of between 15 to 25 age group, while the rest of 7 (43.8%), with $p=0.473$, 6(37.5%) were born from mothers who either have not been to school or

just ended up to primary level, the other 10 (62.5%) come from mother who have gone above secondary level education, $p=0.880$.

Table 3: Obstetrics and Feeding Factors associated with the prevalence of HIV among Under-five

Factors	Case n (%)	Control n (%)	Total n (%)	P value n (%)
Obstetrics Factors				
Month of Delivery				
9months and above	16 (100)	289 (88.9)	305 (89.4)	0.159
Less than 9 month	0 (0.0)	36 (11.1)	36 (10.6)	
Place of Delivery				
Health institution	16 (100)	320 (98.5)	336 (98.5)	0.617
Others	0 (0.0)	5 (1.50)	5 (1.50)	
Who delivered				
Doctor	2 (12.5)	33 (10.2)	35 (10.3)	0.763
Midwife + others	14 (87.5)	292 (89.8)	306 (89.7)	
Mode of Delivery				
SVD	16 (100)	294 (90.5)	310 (90.9)	0.195
C-Section	0 (0.0)	31 (9.5)	31 (9.50)	
Mode of Feeding after D.				
Breast Feeding	16 (100)	319 (98.2)	335 (98.2)	0.583
Other	0 (0.0)	6 (1.80)	6 (1.80)	

Table 3, shows that about 90% of the children, were born at term 305 (89.4%) and only 36 (10.6%) were preterm, and it's interesting that from the study there was no record of HIV infection to those babies born preterm group. However, all the 16 cases of HIV recorded were term children. All the 16 (100%) recorded gave birth at the health institution i.e. either hospital or clinic with $p=0.617$. Only 2 (12.5%) children with HIV were delivered by a doctor the remainder of 14 (87.5%) were delivered by a midwife or traditional birth attendance, with one case of being delivered by the grandmother, $p=0.763$. It was found that all the 16 cases of HIV recorded, were exclusively breastfeed, and only 6 (1.80%) were bottle-fed after delivery, $p=0.583$.

Discussion

To our knowledge this is the first study of its kind done in Lubuto Ndola, Zambia. This lack of evidence based data on the prevalence of under-five HIV to inform policy and guidelines for health improvement in Lubuto and Ndola as a city necessitated this cross sectional study to be conducted. The prevalence rate of HIV among under-five children was observed to be 4.7%, of which 56.2% were females and 43.8% were males giving a ratio of female:male of 1:1.1. It was observed that all positive under-fives come from positive mother confirming that more than 90% of paediatric HIV are the result of Mother-to-child-transmission (MTCT), which mainly occur during the second and third trimester of pregnancy, during delivery or breastfeeding [15]. From the study all of the positive mother except one agreed that they were on or

put full during pregnancy, the adherence however was not assessed. The 4.7% prevalence rate found agrees with 2012 British HIV association proposed guidelines for the management of HIV infection in pregnant women that successful implementation of prevention of mother-to-child transmission (PMTCT) programs can reduce this risk to around 2% in non-breastfeeding populations and less than 5% in breastfeeding populations.[16] Eliminating MTCT and protecting the health of infected mothers is the beginning of the end of AIDS. This however disagree with the study done in Malawi by Gupta et al., which found that the prevalence rate HIV among Children born from women on ART during pregnancy was found to be 2.9% [17], and slightly less comparable with a rate of <2% such as documented in developed countries. [6-9] but agrees with the Zambia National Aids Strategic Framework 2014-2016 which is in line with UNAIDS e-MTCT Global Plan that aims at reducing the risk of MTCT of HIV to less than 5% by the end of the breastfeeding period by 2016 [10]. It is good to note that, all the mother interviewed showed that they had attended antenatal clinic, with (168)46.5% attending more than three (3) times and 172 (47.6%) attending more than four (4) times. All the children who had HIV were delivered vaginally, no case was reported for those who were delivered by caesarean section. This finding is in consonance with previous studies that documented increased transmission in babies delivered by the vaginal route compared with those delivered by elective caesarean section. [18]Also in this study, no transmission of HIV was found among infants who had exclusive replacement feeding, which agreed with the study in Jos University Teaching Hospital by Achonga, Nigeria. [19]

Limitations

The study bias might arise as the study was undertaken at a Clinic with not clearly demarcated catchment area, as some of the mother come from outside its catchment. Despite the full turn up of respondents, the results cannot be generalized to other areas, as places may differ in terms of knowledge, living conditions and accessibility to a health institution.

Conclusions

The results on the prevalence of HIV among under-five children of this study clearly suggest a positive effect of the PMTCT strategies adopted in Zambia and highlight the fact that the goal of virtual elimination, where no HIV-exposed child becomes infected, is possible even in resource-poor settings.

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