

Insensitivity of Infant Mortality Rates to Improved HIV/Aids Financing: Evidence from Post- Dollarised Zimbabwe (2009-2013)

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Recent data from the Ministry of Health and Child Care, Zimbabwe suggest improvements in HIV/AIDS financing and infant mortality rates after dollarisation. The aim of this study was to determine the relationship between HIV/AIDS financing and Infant Mortality Rates (IMR) between 2009 and 2013 in Zimbabwe. A retrospective literature review was conducted to collect quantitative data on HIV/AIDS financing and IMR in Zimbabwe from 2009 to 2013. A case study design was adopted. Pearson's product moment correlation coefficient, linear regression analysis and t-test were performed to generate evidence. There was moderately negative correlation ($r=-0.60$) between IMR and total HIV/AIDS financing in Zimbabwe between 2009 and 2013, which was not statistically significant ($p>0.05$). Infant mortality rate decreased by 55 per cent while there was an increase of 440 per cent in total HIV/AIDS financing in the country from 2009-2013. Improving financing alone may not directly result in positive health outcomes in developing countries unless the entire health system is strengthened. Low-and middle income countries need to prioritize interventions focused on integrating infectious disease interventions with good public health practices in order to achieve and sustain low child mortality rates.

Key Words: Zimbabwe, dollarized, socioeconomic, infant mortality, HIV/AIDS financing, health system, MDGs.

Introduction

Sub-Saharan Africa continues to face the highest risk of deaths in the first months of life (UN, 2013). The region experienced an increase of 19 per cent in neonatal mortality from 37 per cent in 1990 to 44 per cent in 2013 (UNICEF, 2013). This demonstrates the uncertainty that faces the region of achieving the Millennium Development Goal (MDG) 4 come 2015 (UN, 2013). Zimbabwe recorded some improvements in infant mortality outcomes since 2007 despite catastrophic socio-economic challenges the nation faced from early 2000s (MOHCW, 2011). Some countries like Nigeria and Democratic Republic of Congo have registered souring child mortality rates (under-five mortality) in the last few years (UNICEF, 2013). The leading causes of child mortality are pneumonia, preterm complications, diarrhoea, measles, tetanus, AIDS and malaria (Liu et al., 2012). In Zimbabwe, 21 per cent of the under 5 child mortalities are attributable to AIDS (MOHCW; 2010; 2011); demonstrating the need to scale up interventions to combat the retroviral disease.

Maternal HIV infection has been found to be associated with increased child mortality directly or indirectly through maternal illness (Ndiranga et al., 2012). Infant mortalities have been found to be 4 times higher in infants whose mothers died of HIV than those whose mothers were alive (McNairy et al.2011). Early initiation of antiretroviral treatment

in Zimbabwe has been found to improve chances of survival in mothers and their infants and simultaneously reduce population HIV incidence (Hargrove & Humpfrey, 2010). Other studies have shown that reduction in early child mortality is significantly associated with expanding HIV treatment service programmes (Ndirangu et al.,2012; Ndirangu et al., 2010; Landes et al.,2012). Johnson et al (2012) also noted that early initiation of ART in infants has a great impact in reducing mortality rates in children. Paradoxically, some studies have found that scaling up prevention of mother-to-child transmission (PMTCT) and antiretroviral therapy has limited efficacy on child mortality rates unless the programmes are integrated with high-quality maternal and neonatal care (Kerber et al.,2013; Barker et al.,2011). Cheng et al., (2012) argued that access to water and sanitation independently influenced infant, child and maternal mortality outcomes hence the world should ensure improved water and sanitation access in order to achieve the MDG 4. The study by Eneh (2011) also compliments the findings of Cheng et al (2012) by arguing that poor water governance is one of the leading causes of child, infant and maternal deaths in Africa. He further recommended the formulation of preventive healthcare and pro-poor health policies in order to improve the quality and availability of safe water. Fink et al (2011) also found out that improving access to water and sanitation was the most effective public health

intervention the international community had at its disposal and this is associated with reduced infant mortality rates. In US, Mays and Smith (2011) noted that increased public health expenditure was associated with reduction in infant mortality. Increased public health spending was the most consistent determinant of reduced community level mortality. However, it needs to be complimented by improved public health practices if health outcomes are to be sustainable, especially in low-resource communities (Mays et al., 2011).

There is growing consensus to promote the strengthening of health systems alongside scaling up disease specific interventions. However such scaling up can be leveraged on, to provide good quality public health services in developing countries. Increased integration of PMTCT into maternal neonatal and child health (MNCH) service delivery, adoption of successful implementation models and the re-conceptualisation of the PMTCT care continuum are some of the imperative strategies that may reduce infant and child mortalities in sub-Saharan Africa (McNairy et al., 2011). In Zimbabwe, the introduction of the PMTCT programme, the diagnosis of early infant HIV using DNA-PCR technologies and the scaling up of ART services are the notable achievements since 2007 (MOHCC, 2014). Paediatric ART coverage has been lagging behind in the country due to multiple challenges such as lack of qualified health professionals, limited laboratory capacity to provide timeous HIV DNA PCR test results and lack of adequate funding (MOHCC, 2014). In order to promote universal access to HIV treatment in children, cost-increased funding is required as well as data on intervention costs and outcomes (Tolle et al., 2013). Cost data are essential in informing policies and promoting effective planning and management of interventions in resource-limited settings. The adoption of the WHO 2013 guideline is envisioned to increase ART coverage rate amongst children and fortify the health system to be able to combat child related illnesses. This comes at a time donors are tightening their funding requiring governments to design and implement interventions that are efficient (Tolle et al., 2013). However, little is known on the relationship between infant mortality rate and the investments the government and international partners such as GFATM, UN, USAID, DFID, Australian Aid, PSI and CIDA have made from 2009-2013 (MOHCC, 2014).

Zimbabwe is faced with a plethora of political, social and economic challenges since the post-2000 era causing massive weakening of the social services sectors mainly education and healthcare system (Nyazema, 2010). However, despite these challenges the country has made significant strides in combating HIV/AIDS in last few years and the prevalence rate of the retroviral infection dropped

from 29 per cent in 1999 (NAC, 2010) to 14.9 per cent in 2013 (NAC, 2013). The major contributing factor has been the improvement in both domestic and foreign HIV/AIDS funding since the dollarisation of the economy (NAC, 2013). Improved funding resulted in the scaling up of PMTCT, VCT and PITC programmes which have promoted behavioural change in addition to increasing access to basic health care services in the country (Chevo et al., 2011). These HIV/AIDS scale up programmes strengthened the health system to some extent, thereby improving child survival chances.

Few studies have examined the association between HIV/AIDS financing and IMR in the sub-Saharan region (Muldoon et al., 2011; Moodley et al., 2011; Cohen et al., 2013). One recent study by Muldoon et al (2011) has looked at overall health system determinants of infant mortality. However health system strength indicators are still largely undetermined or misunderstood. The association of HIV/AIDS financing and infant mortality rate in the context of post-dollarised Zimbabwe remains unquantified. Providing empirical evidence is crucial to informing and adjusting health policies in Zimbabwe.

Methods

Study design and data collection

A case study approach was used and it was confined to Zimbabwe. The study cover the period from 2009-2013 which was immediately after the dollarisation of the economy. The use of a case study provided an opportunity to relate the trends of HIV/AIDS financing and IMR in Zimbabwe. This research study utilised desk research approach which reviews books, documents, newspapers, magazines, articles and journals to understand the nature and extent of the problems under investigation. Desk research is the analysis of information that already exists, in one form or another (Rickinson et al., 2009). The information is easily available since it has already been collected and published in policy documents, journals and other articles available on the internet. Some of the documents were collected from the Ministry of Health and Child Care offices at Kaguvi Building, World Health Organization, UNDP, UNICEF and USAID offices in Harare. A rigorous desk review was conducted to identify the relevant literature on the impact of HIV/AIDS financing on IMR post dollarisation in Zimbabwe.

The research involved extracting already existing data by pulling out that which is relevant to the research at hand, summarizing it, logically analysing it and statistically treating the data to report the results. The data was searched for evidence globally, with a bias towards Zimbabwe

especially after 2009. The starting point was documents from Southern Africa, Zimbabwe and then from developed nations to understand the global perspective on HIV/AIDS financing and associated health outcomes. We critically examined the association between HIV/AIDS financing and IMR from 2009 to 2013.

For this study quantitative data were obtained from secondary sources such as reports, journals, publications and newsletters as well as books, statistical reports, conference presentations and internet. Secondary sources of data formed the backbone of this study with no primary sources of data used given the nature of the study and the data that was required to generate evidence. During the examination and analysis of reports, publications and internet articles, relevant information was entered into a data collection matrix table for easy access during data presentation and analysis.

Policy documents such as the National Health Strategies, Zimbabwe Health Investment Case, and Zimbabwe Health Systems Assessment 2010 which were adopted after the dollarisation of the economy were examined and analysed to extract data for the study. We also examined publications from WHO, PEPFAR, USAID, UNITAID, UNAIDS, UNICEF, Ministry of Health and Child Care, Ministry of Finance and National AIDS Council to extract relevant data to analyse for this study.

The main source of information was the internet from where a large number of publications, reports and a wide range of databases including UN agencies like WHO, UNAIDS, Pub Med, Plos One, Popline, Science Direct and The Lancet. Further information was obtained from Google Scholar where numerous phrases were used to search for relevant publications, reports and monographs. Snowballing technique was utilised to widen the search for data (Jalali et al., 2012). The search was done using phrases such as “Impact of health financing on IMR in sub-Saharan Africa”, “HIV/AIDS financing in developing countries”, “HIV/AIDS financing and IMR”, “HIV/AIDS financing and infant mortality rates”, and “Determinants of IMR in Africa”.

This study did not require ethical approval, as it was based on publicly available data.

Statistical Analysis

Upon completion of a data matrix, data was categorized into two groups' namely financing data

which comprised of HIV/AIDS financing figures and IMR. The data was presented in a tables and graphs and analysed separately. It was later analysed corporately to generate evidence for the study. In analysing data, total HIV/AIDS financing was made the independent variable and IMR was the dependent variable. Pearson product-moment correlation coefficient was used as a statistical measure to determine the degree to which one variable was linearly related to another. It was used to describe the relationship between dependent and independent variables. The coefficient of determination was obtained using linear regression analysis. Linear association between variables established if it was statistically significant ($p < 0.05$) as determined on STATA version 12 package (STATA Corp, NY, USA. If the p-value was less than the significance level ($p < 0.05$) the data was interpreted as having statistical significance while p-value greater than the significance level ($p > 0.05$) meant no statistical significance as determined on STATA version 12 package (STATA Corp, NY, USA). Analysis of variance (ANOVA) was used to determine whether there was a statistical significance in the variation between total HIV/AIDS financing and infant mortality rates in Zimbabwe between 2009 and 2013.

Results

Trends in Infant mortality rates in Zimbabwe (2009-2013)

There was a significant decline of 55 per cent in infant mortality rates in Zimbabwe between 2009 and 2013, from 60 per 1000 births in 2009 to 27.25 per 1000 births in 2013 (See Table1 and Figure 1). There was no change in IMR between 2010 and 2011 in the country. The declines from 2009 to 2012 were small as compared to the huge decrease from 2012 to 2013, where a 51 per cent decline was recorded. However, it is still possible for Zimbabwe to meet its MDG 4 of 27 per 1000 birth in child mortality by 2015. This would require the scaling up and sustenance of current HIV/AIDS programmes in particular, PMTCT. The integration of disease specific interventions with the health system and promotion of good maternal and neonatal care are also implied.

Table 1: Infant mortality rates and total HIV/AIDS financing in Zimbabwe from 2009-2013

Year	2009	2010	2011	2012	2013	Total
IMR (per 1000 births)	60	59	59	56	27.25	261.25
Domestic Sources (NATF) (US\$ million)	5.7	20.5	26.5	32.5	33.5	118.7
Global Aid (US\$ million)	54.3	113.7	171.9	221.1	228.5	789.5
Total (US\$ million)	60.0	134.2	198.4	253.7	262	908.3

Source: MOHCW, 2010; UNICEF, 2013; World Bank, 2014; Index Mundi, 2013; NAC, 2013.

Table 1 above, shows the trends of IMR in Zimbabwe, in which there were slight decreases from 2009 to 2012, and a huge decline between 2012 and 2013. The overall decrease in infant mortality rate was 55 per cent, of which 51 per cent of this decline was between 2012 and 2013.

Figure 1 shows the trends of IMR, with slight decrease from 2009 to 2012. There was however, a big jump from 2012 to 2013, accounting for 51 per cent of the changes over the 5 year period.

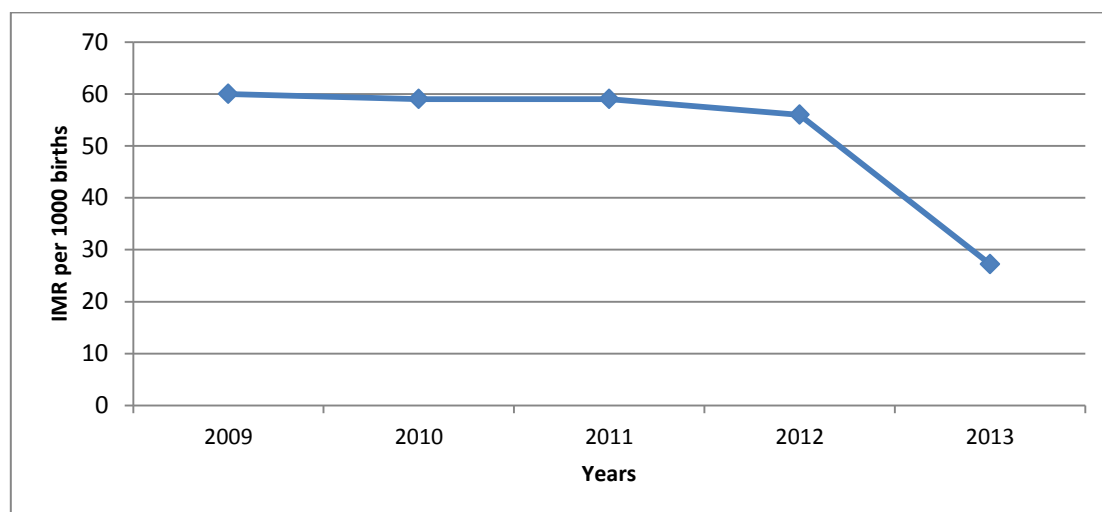


Figure 1: Changes in IMR (per 1000 births) in Zimbabwe from 2009 to 2013.

Trends in total HIV/AIDS financing in Zimbabwe (2009-2013)

There was a significant improvement in both domestic and foreign HIV/AIDS financing in Zimbabwe from 2009 to 2013 (see Table 1). This followed the adoption of the dollarised economy. Table 2 shows the improvements in HIV/AIDS financing from the major contributors in Zimbabwe. There was an overall of 440 per cent increase in financing from 2009 to 2013. Domestic financing (AIDS levy) increased by 488 per cent

with foreign aid assistance rising by 321 per cent in the same period. Domestic sources contributed 13 per cent of the financing with foreign partners contributing 87 per cent almost consistently from 2009 to 2013. HIV/AIDS per capita expenditure improved significantly from US\$5 in 2009 to US\$19 in 2013, although this fell far short of the regional average of US\$74 (Chevo et al., 2011).

Figure 2 shows dynamics in HIV/AIDS financing. There were huge increases from 2009 to 2012, and a slight increase from 2012 to 2013.

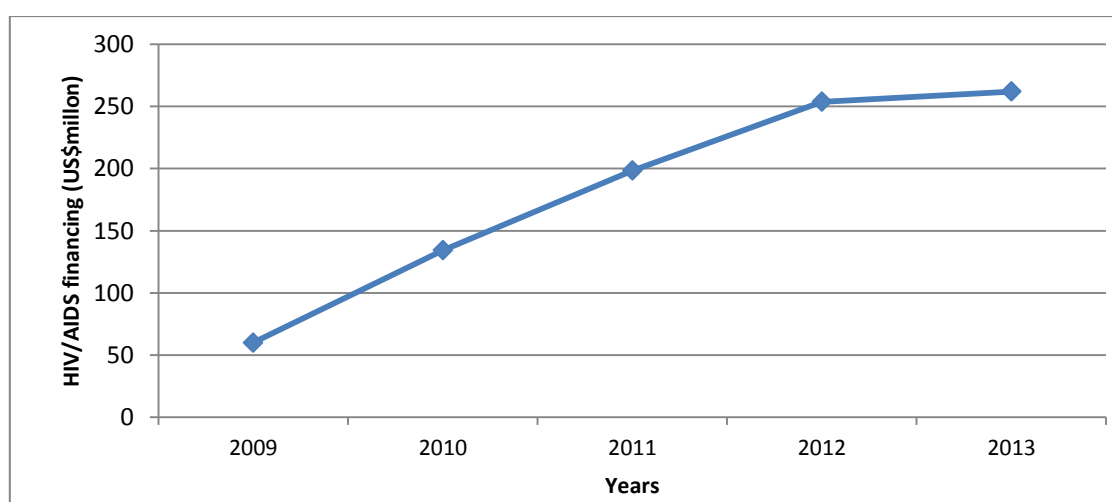


Figure 2: Variations in total HIV/AIDS financing in Zimbabwe from 2009-2013

The Pearson's product moment correlation coefficient ($r=-0.60$) and linear regression analysis between two variables, HIV/AIDS financing and IMR, from 2009 to 2013 in Zimbabwe showed a moderately negative association. However, it was not statistically significant ($p>0.05$). This shows that relationship could be due to chance and we therefore concluded that there was no linear relationship between these two variables under study. The coefficient of determination (R^2) was 0.36 meaning that 36 per cent variation in IMR was influenced by variation in HIV/AIDS financing in Zimbabwe from 2009 to 2013. The remainder of 64 per cent was due to factors such as other health systems components (governance, service delivery, medical technologies and products, health information systems and human resources for health), health policies and socio-economic factors.

Discussion

Zimbabwe has been going through tough socio-economic challenges, which had a huge negative impact on socio-economic environment and the health system. These difficulties had negative implications on the efforts to scale up HIV services and reduce infant mortalities. Despite these challenges the stabilization of the economy following the Global Political Agreement (GPA) and the adoption of the dollarised economy in 2009 resulted in improved HIV/AIDS financing. Infant mortality rate also decreased significantly by 55 per cent from 2009 to 2013 showing positive dynamics in the socio-political and macroeconomic environment in Zimbabwe (Muldoon et al. 2011). With the MDGs deadline of 2015 drawing closer, the attainment of the child mortality goal of 27 per 1000 births appears attainable. The most significant sources of financing for HIV/AIDS programmes were National AIDS Trust Fund (AIDS levy) and foreign aid from global partners.

The improvement of financing resulted in expanded HIV services from 2009 to 2013 throughout the country. In the period 2009-2013, approximately US\$ 1 billion was invested in HIV/AIDS preventive, care and treatment programmes in Zimbabwe. Domestic resources (AIDS levy) accounted for 13 per cent of this investment, while foreign aid accounted for 87 per cent (see table 1). This pattern shows that Zimbabwe has a higher dependence rate than other low-income countries which received 56 per cent of their HIV financing from international donors in 2012 (UNAIDS, 2013). Sustainability of HIV/AIDS services is a challenge in cases where donors pull out their funding or they wind up their programmes. There was an increase of total HIV/AIDS financing of 440 per cent from 2009 to 2013. The HIV/AIDS per capita expenditure estimates also improved from US\$5 in 2009 to

US\$19 in 2013, although this fell far short of the regional average of US\$74.

Despite the improvement in HIV/AIDS financing the decreases in infant mortalities over the 2009-2013 were very slow, with the 51 of the total 55 per cent decrease taking place in the 2012-2013. This shows that there was poor sensitivity of the IMR to the improved HIV/AIDS financing. The lack of linear association between IMR and HIV/AIDS financing shows that the major determinants in reducing IMR in Zimbabwe are related to the performance and structure of health system and not financing alone. Other factors such as access to water and sanitation, and transparent governance could also be significant determinants of IMR in Zimbabwe (Cheng et al., 2012; Ekeh, 2011; Fink et al., 2011; Muldoon et al., 2011). While, HIV/AIDS financing is part of health financing, it could not influence IMR significantly in the country. These findings support the need to integrate HIV/AIDS programmes with other public health interventions such as good maternal and neonatal care to improve IMR (Kerber et al., 2013; Barker et al., 2011). The improvement of access to safe water and sanitation and transparent governance are also implied if IMR is to be reduced in line with the MDGs in Zimbabwe. The country has been experiencing poor water and sanitation services, particularly in urban areas, which in 2008-9 resulted in a disastrous cholera epidemic that officially claimed more than 4000 lives and infected close to 100 000 people country-wide (Mason, 2009). The insensitivity of the IMR to improved HIV/AIDS financing is evidence of the greater impact of these factors. While, increased public health spending has been associated with decreased infant mortalities (Mays et al., 2011), this has not been the case in Zimbabwe between 2009 and 2013. The other possible explanation for the poor sensitivity of IMR to improved HIV/AIDS financing was the weakening of the health system over a number of years since the 2000s. These weaknesses could not have been addressed in a short period of five years, although a huge decrease was noted in IMR in 2012-2013. Hence, it remains pertinent for the government to formulate policies that promote the integration of disease specific interventions with the health system, improve water and sanitation and transparent governance.

This study had its fair share of limitations which deserve the justice of mentioning. The regression analysis and correlations showed no statistically significant association between IMR and HIV/AIDS financing but the sample size was small thereby limiting the analysis. Some of the data used were estimates because exact figures could not be obtained. Some of the data sources had different figures and for the purposes of this study we used data from credible sources i.e. WHO, World Bank, UN agencies, government

ministries and peer-reviewed publications. Data on out-of-pocket and private insurance HIV/AIDS financing was not readily available for this study, although they are minor sources of financing in the Zimbabwean context. Some the donor funding comes as goods and services which may not be easily quantifiable to provide accurate data which may have resulted in under- or over-estimation of their investments towards HIV/AIDS responses in Zimbabwe. A ten year study of the dynamics of IMR vis-à-vis health system strengthening would reveal the predominant determinants of IMR in post-dollarized Zimbabwe.

Conclusion

Although data was limited to 5 year period, this research revealed that there was significant improvement in HIV/AIDS financing and slight decreases in infant mortality rate in post-dollarised Zimbabwe. Infant mortality rate (IMR) is one of the most crucial indicators of socio-economic development. Governments in low-and middle income countries need to formulate policies that will integrate disease specific interventions with the health system in order to strengthen the entire system. The integration of disease-specific interventions with good public health practices such as provision of adequate water and sanitation, promotion of good maternal and neonatal care; transparent governance and improvement of health financing from domestic resources is imperative. This will undoubtedly ensure sustainable public health outcomes at the same time fortifying the health system. Pro-poor health policies are also implied on the background of high poverty levels in most developing countries. These measures are critical for the achievement of the MDG 4 come 2015, in addition to sustaining low IMR in the post-MDG era. Promotion of good political and socio-economic environment provides a healthy background upon which public health interventions can be premised in low-and middle income countries.

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