



RESEARCH ARTICLE

THE COMPLEXITIES OF HIV/AIDS FINANCING IN DIRECTLY INFLUENCING HIV INCIDENCE AND MORTALITY OUTCOMES IN POST-2009 ZIMBABWE

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ABSTRACT

Background: Zimbabwe experienced an increase in HIV incidence and mortality rates between 2009 and 2011 despite improved HIV/AIDS financing. The aim of this study was to investigate the associations between HIV/AIDS financing and HIV incidence and mortalities from 2009 to 2013 in Zimbabwe.

Methods: A secondary data analysis of existing data on HIV/AIDS financing trends and HIV incidence and mortality rates in Zimbabwe from 2009 to 2013 was carried out. Pearson's product moment correlation coefficient analysis and t-test were carried out using STATA@version 12 to generate evidence.

Results: There was moderate positive correlation ($r = +0.63$) between HIV/AIDS financing and HIV incidence rate which was not statistically significant ($p > 0.05$). The correlation between HIV/AIDS financing and HIV-related mortality rate in Zimbabwe (2009-2013) was poor ($r = +0.15$) ($p > 0.05$). Total HIV/AIDS financing increased by 323 % in Zimbabwe from 2009-2013.

Conclusions: This study showed that improving HIV/AIDS financing could not directly influence HIV incidence and mortality rates in Zimbabwe. Other factors such as health system and patient factors may be primary determinants of HIV incidence and mortality rates in developing countries.

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ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ARV	Antiretroviral Therapy
CHAI	Clinton Health Access Initiative
CIDA	Canadian International Development Agency
ESP	Expanded Support Programme
EU	European Union
GDP	Gross Domestic Product
GFATM	Global Fund to Fight against AIDS, TB and Malaria
GOZ	Government of Zimbabwe
HIV	Human Immunodeficiency Virus
MDC	Movement for Democratic Change
MGD	Millennium Development Goals
MoF	Ministry of Finance
MoHCC	Ministry of Health and Child Care
NAC	National AIDS Council
NGO	Non- Governmental Organization
PEPFAR	President's Emergency Plan for AIDS Relief
TB	Tuberculosis
UN	United Nations
UNAIDS	Joint United Nation Programme for HIV/AIDS
USD	United States Dollar
USG	United
WHO	World Health Organization
ZANU-PF	Zimbabwe African National Union-Patriotic Front

INTRODUCTION

Sub-Saharan Africa remains the most affected region in the global HIV/AIDS epidemic with an estimated 23.5 million people living with the retroviral infection by 2011, representing 69 percent of the global HIV burden [UNAIDS, 2012]. In 2011, 92 per cent of pregnant women living with HIV resided in sub-Saharan Africa, while 90 per cent of children who acquired HIV in the same year were also from the region. The epidemic remains disproportionately impacting women more than men, who account for 58 per cent of all the people living with HIV in the region. In 21 countries in sub-Saharan Africa, external funding for health care especially HIV/AIDS programs account for more than 50% of the total investment. However, some countries like South Africa and Botswana are increasing their roles in funding responses to HIV [UNAIDS, 2012; DeJongh *et al.*, 2013; Vermund *et al.*, 2012].

The prevalence of HIV in sub-Saharan Africa has been influenced largely by poverty, as most countries in the region are less empowered with resources especially financial to provide adequate health care services and built strong health systems [Fox 2010; Buve *et al.*, 2003]. Arguments by former South African President, Thabo Mbeki that HIV was not the cause of AIDS but that poverty was, sparked serious policy controversy; however, there is empirical evidence to support the positive correlation between HIV/AIDS prevalence and

poverty [Fox, 2010]. However, some studies have also found higher HIV prevalence rates in wealth societies and amongst wealth people [Ibid; 2012]. In the era of HIV/AIDS, poverty exacerbates the infection by reducing the health care access and predisposing poor people to risk behaviours such as sex work, drug abuse and sexual violence which are known predisposing factors to HIV infection [Jewkes *et al.*, 2010]. Geographical access to health service centres is correlated to good health outcomes and in sub-Saharan Africa due to poor health financing the distribution of health centres and health professionals reduces accessibility of health services hence increasing HIV/AIDS prevalence and mortality rates [Comber *et al.*, 2011]. The poor availability of health services in poor countries result in long waiting times and promote the use of informally trained health providers such as dispensing assistants as well as promote ethno-medical practices especially in Africa. Some traditional healers in sub-Saharan Africa still rely on ethno-medical practices such as use of the same razor blades on many patients, which predisposes people to higher risks of HIV and other blood borne diseases. The use of these alternative services is associated with poor health outcomes and increases the risks of contracting and spreading HIV/AIDS [Street *et al.*, 2012].

Health systems are under threat in many developing countries especially with the incidence of HIV/AIDS and its common opportunistic infection, tuberculosis. This has resulted in high HIV/AIDS prevalence rates especially amongst the 15-49 years age group, reduced life expectancies, high infant mortality rates and high population mortality rates in many developing countries [UNAIDS, 2013]. The fragile health systems in sub-Saharan Africa are due to poor funding and other factors which include political, economic, environmental and social impediments [Swanson *et al.*, 2012]. These, especially the economic factors seem to be more influential in determining health outcomes than biological factors. One of the pertinent causative factors is poverty and it is quite clear on the basis of empirical evidence that the poorest countries have been the most affected by HIV/AIDS, TB and malaria [Sharpe *et al.*, 2012; Anyangwe *et al.*, 2006]. While funding and other forms of support have been channelled to various health initiatives by international NGOs and UN agencies, the issues of poor governance and lack of political will, have been causes for concern with regards to health systems strengthening processes.

Global Health initiatives (GHIs) have focused on HIV/AIDS, TB and malaria as these are the major causes of mortality, morbidity and hugely impact socioeconomic development in developing countries [Kendall *et al.*, 2012]. This has resulted in varying impacts on health systems in developing countries like Zambia and Malawi. Disease specific interventions that global partners have been promoting in recent years especially to combat HIV/AIDS, TB and malaria have resulted in huge positive impacts in sub-Saharan Africa. However, generally health systems have been weakened to some extent by these disease specific interventions in sub-Saharan countries such that the integration of these interventions into the health systems strengthening process is now topical amongst global partners [Keugoung *et al.*, 2011; Yu *et al.*, 2008]. This has seen the neglect of other chronic diseases, reproductive health problems, cancers, respiratory infections amongst other diseases. A significant proportion of the scarce human

resources has also been siphoned into lucrative HIV/AIDS programmes at the expense of other basic health care services and the repercussions has been weakened health systems [Pfeiffer *et al.*, 2010; England, 2007]. These on-going debates whether to scale up vertical interventions with the assumption that health systems will strengthen spontaneously or invest in strengthening the entire health systems (horizontal interventions) have varying implications in health policies in sub-Saharan Africa [Yu *et al.*, 2008; Pfeiffer *et al.*, 2010; England, 2007]. The US President's Emergency Plan for AIDS Relief (PEPFAR) has started advocating and supporting horizontal interventions, which are interventions not biased towards specific diseases but focus on strengthening the entire health system to ensure sustainability [Collin *et al.*, 2012]. However, little is known on how HIV/AIDS financing has impacted the HIV incidence and mortality rates in the Zimbabwean context where GHIs have also been implemented for over a long period of time.

Mechanisms of health financing and their affordability in developing countries remain controversial [Fryatt *et al.*, 2010]. User fees have also been a contentious source of health financing in the developing countries [Hercot *et al.*, 2011; McPake *et al.*, 2011; Riddle *et al.*, 2010]. The adoption of user fees as a source of health financing, emanates from governments inability to allocate adequate financing to the health system, low salaries of health workers, the limited public control over pricing by public providers, and the lack of medical supplies such as drugs. Several non-governmental organizations and Western governments have been advocating for the abolition of user fees in developing countries as a way of removing a barrier to healthcare access [Riddle *et al.*, 2010]. The World Bank has avoided a generalised policy regarding user fees as most governments in developing countries still use them as source of health financing [McPake *et al.*, 2011]. Early user fees studies have shown that income, price and quality are not the determinants of demand for health services although utilization is affected by price and cost [Hercot *et al.*, 2011].

There are a number of studies which have shown that introduction of user fees or increases in prices can lead to decreased utilization of healthcare services [Riddle *et al.*, 2010]. This has serious consequences in HIV/AIDS prevention, care and treatment especially for the poor in developing countries [Rosen *et al.*, 2011]. Therefore, financial access or affordability of the health services has become the most important determinant of access and is most directly associated with dimensions of poverty [McPake *et al.*, 2011; Jacobs *et al.*, 2011]. Studies in Zambia, Uganda and other developing countries have shown that user fees have catastrophic welfare implications and causes impoverishment on households [Bredenkamp *et al.*, 2010]. This has implications in HIV/AIDS prevention, care and treatment with the poor mostly affected and decimated by the retroviral disease on the basis of their inability to pay for healthcare services or meet healthcare seeking associated costs. However, in Zimbabwe HIV/AIDS preventative, care and treatment programmes are mainly funded from the fiscal resources like AIDS levy as well as from international donor funds resulting in no user fees in the public sector [NAC, 2013].

With the global HIV/AIDS pandemic nearing 3 decades, the challenges of resource mobilization and management are increasingly prominent. The AIDS 2031 project modelled the long term funding required for HIV/AIDS programmes in developing countries with a range of scenarios and significant variations in costs; ranging from US\$ 397 to \$722 billion globally between 2009 and 2031 [Hecht *et al.*, 2010]. However, middle income countries with low burden of HIV/AIDS are projected to gradually be able to take on the modest costs of their HIV/AIDS responses where as low income countries with high disease burdens will continue to rely on foreign support for their rapidly expanding costs. A small proportion of middle income countries with HIV prevalence like South Africa could phase down foreign assistance for HIV/AIDS responses assuming strategic investments are made for prevention and efficiency gains are made in treatment [Katz *et al.*, 2013].

The HIV domestic financing in 116 low and medium income countries between 2007 and 2009 was US \$ 9 billion with 55 per cent of the expenditure taking place in sub-Saharan Africa [UNAIDS, 2010]. This shows a huge disease burden of HIV in a region with only 10 per cent of the world's population. Most countries spent 54 per cent of their resources on care and treatment programmes particularly ARVs, laboratory tests and health worker salaries [Ibid; Maddison *et al.*, 2010]. Studies have shown that in order to reduce the transmission of HIV efficiently mass media campaigns, interventions targeted at sex workers and treatment of STIs are imperative in cases of resource scarcity. However, PMTCT, VCT and school based education programmes would yield further health gains at higher budget levels and these are highly cost effective using standard international benchmarks [Hogan *et al.*, 2010].

In a multi country analysis by CHAI, the average HIV/AIDS treatment per patient per year in low-income countries was US\$303. Zambia, Malawi and RSA had treatment figures per patient per year of US \$278, \$136 and \$682 respectively [CHAI, 2012]. In developing countries 50 per cent of total costs of HIV/AIDS treatment went to procurement of ARVs and 20 per cent of total HIV treatment expenditure was consumed by health worker salaries [34]. These figures have been increasing with the liberalisation of initiating criteria by WHO and the increase in cases of ARV intolerance and toxicity [Sharma *et al.*, 2014; Doherty *et al.*, 2013]. Improved HIV/AIDS financing in developing countries has been credited with increased treatment coverage. The increase to 8 million of people on ARV by 2011 was associated with 20 per cent reduction in HIV related mortality rates in developing countries [Avila *et al.*, 2013].

While improved financing has resulted in expanded HIV testing and counselling programmes, reduced mortality and incidence rates, increased treatment coverage rates, the number of patients lost during ART has also been increasing. The time between testing and starting ART is still very long in some developing countries and this has negative implications in health outcomes of the population [WHO, 2013]. Habyarimana *et al* (2010) noted that employee absenteeism was reduced significantly due to ARV treatment in Botswana firms, implying the economic benefits of improving HIV/AIDS financing. Therefore, improving financing for HIV/AIDS responses remains on international

agenda in order to reduce HIV incidence and mortality rates which negates any development processes in developing countries.

It is widely accepted that the HIV/AIDS epidemic is a developmental crisis which requires multifaceted approaches and coordinated corporate efforts in order to deal with it or its multidimensional impacts [UNAIDS, 2012]. Earlier in the decade HIV/AIDS treatment seemed worthy but an insurmountable task given the high cost particularly in sub-Saharan Africa. In subsequent years billions of dollars have been mobilized making treatment affordable. It was estimated that about 4 million people were receiving antiretroviral treatment world-wide in 2009 and their number had doubled by 2013 [Ibid; Avila *et al.*, 2014]. However, the world is again struggling to sustain life saving antiretroviral due to global economic slowdowns and financial crises in many countries [Soni *et al.*, 2009].

It has also taken sub-Saharan Africa significant strides to access cheaper ARVs with South Africa having led the battle [Sell *et al.*, 2004; Smith *et al.*, 2006; t Hoen *et al.*, 2011; D'Adesky *et al.*, 2014]. In 2012, US\$18.9 billion was made available for HIV/AIDS programmes in low and middle-income countries, and this figure was a 10 per cent increase from the 2011 financial resources. Although the international HIV/AIDS assistance remained flat in real terms in 2012, many low- and middle-income countries have increased their financial investments for HIV/AIDS using domestic resources which accounted for 53 per cent of all HIV related spending in 2012 [UNAIDS, 2012; 2013]. Most of the increases in domestic funding of HIV/AIDS programmes have taken place in upper middle income countries and many low and middle income countries still remain dependent on international assistance in their HIV/AIDS programmes. Most of the domestic resources account for the majority of spending for treatment and care; international spending financed the majority of the prevention efforts. In an effort to ensure sustainability of resources for HIV/AIDS responses many countries have adopted innovative financing methods such as dedicated tax levies and AIDS trust funds [Ibid].

Zimbabwe is a developing country in the sub-Saharan region where HIV/AIDS affects millions of people and kills thousands daily. The sub-Saharan country, Zimbabwe, has been experiencing serious challenges in almost every sphere be it political, economic, environmental and social since the early 1990s after the adoption of economic structural adjustment programmes [Sahn *et al.*, 1995]. These challenges negatively impacted health systems and with the incidence of HIV/AIDS the systems had virtually collapsed by 2008. This saw the outbreak of a serious cholera epidemic between 2008-2009 which was declared a national disaster after claiming thousands of lives and infected tens of thousands more [Mason, 2009].

However, with the dollarization of the economy and the formation of a Government of National Unity between ZANU-PF and MDC political parties some stability was achieved in the economy. This also saw the revival of the health systems through improved financing and the coming of various international NGOs to resuscitate the defunct health systems. With one of the highest HIV prevalence rates

worldwide, the pressure exerted on the health systems coupled with massive brain drain of health professional made the health systems in Zimbabwe in 2000s to be unsustainable [Mason, 2009; Nyazema, 2010]. Even the incidence of the cholera epidemic was inevitable on the basis of poor sanitation and unreliable water supplies that affected many urban areas against a background of a defunct national health system in particular non-funding of the health sector [Ibid].

The country has experienced some significant improvements in the health delivery system as indicated in the 2010 Zimbabwe Health Systems Assessment [Osika *et al.*, 2010]. The government introduced the AIDS levy in 2000 as an innovative strategy to mobilize funds for the prevention and cure of HIV/AIDS in Zimbabwe [Mawera, 2005]. This fund is managed by the National AIDS Council (NAC) and from 2009 to 2011, US\$52.7 million was collected from income tax of individuals and corporations [NAC, 2012] and these funds have been invested into HIV/AIDS prevention, care and treatment programmes throughout the country.

However, due to macroeconomic challenges in the 2000s that saw the collapse of the Zimbabwe dollar in 2008, the significance of the AIDS levy was reduced to levels where it could not support any tangible HIV/AIDS preventions, care and treatment programmes and this predisposed the nation to higher risk of HIV infection [GOZ/UN, 2010; Osika *et al.*, 2010]. Global Health Initiatives such as US President's Emergency Plan for AIDS Relief (PEPFAR), Global Fund to Fight against AIDS, TB and Malaria (GFATM), CIDA, EU and UN agencies amongst other external funders have also contributed significant amounts of funds towards HIV/AIDS prevention, care and treatment programs in Zimbabwe to date [Ibid, Shamu, 2012]. Despite the achievements in strengthening health systems more work is still needed to ensure equity and tackle the increasing health services demand in Zimbabwe.

The disease burden from HIV/AIDS still requires more attention and channelling of more financial resources in order to strengthen health systems which will result in reduced incidence and mortality rates in Zimbabwe. With the adoption of WHO 2013 guidelines and Option B plus policy the demand for more resources in HIV/AIDS responses is also on the increase at a time economic performance is still low in the country. An additional 400,000 people will require ARVs in the recent future in line with the 2013 WHO guidelines and this will result in 1.2 million people being on ARV in Zimbabwe [MoHCC, 2014]. With the current government and donor HIV/AIDS financing levels this huge burden cannot be sustained and paradigm shift in financing mechanisms are thus imperative.

In Zimbabwe, while dollarization brought some stability in the economy, it resulted in increased costs of health care especially medical commodities like drugs [Osika *et al.*, 2010]. Hence, even the cost of ARVs which are mostly imported went up resulting in stock-outs [Herald, 2013]. The demonetization of the economy in 2009 also resulted in the loss of people and medical insurance saving which caused challenges in accessing of health care services. With no government compensation system in place, people and medical insurance companies lost their saving due to the

change over to the multi-currency system. The negative impact of this scenario has been felt in the economy and in the quality of healthcare services in the country [50]. Therefore, the country has had to rely mostly on donor funding to bankroll HIV/AIDS programmes and this has challenges of sustainability in cases where donors pull out their funding.

METHODS

A secondary data analysis was carried out of HIV/AIDS financing, HIV incidence and mortality in Zimbabwe between 2009 and 2013. Data on HIV/AIDS financing, HIV incidence and mortality rates were obtained from Monitoring & Evaluation Department of the National AIDS Council in Zimbabwe. However, verification of these data was done using Ministry of Health and Child Care reports, World Bank, World Health Organization and United Nations publications. A data collection matrix table was used during the literature search for the study. The study followed a retrospective case study of post-dollarised Zimbabwe, from 2009 to 2013.

Data sources and setting

Zimbabwe is a low-income country in the sub-Saharan region and it has been going through devastating political and socio-economic challenges since the early 2000s [Nyazema, 2010]. The country has a population of about 12.75 million and its gross domestic product was USD12.8 billion in 2013. For administrative purposes the country is divided into ten provinces. The health system is organised in such a way that there are primary care facilities, secondary, tertiary and quaternary (referral) health institutions in the country.

Data for this study was mainly obtained from paper and online publications of the Ministry of Health, ZimStats, National AIDS Council, WHO, UN and the World Bank. Online search engines used included Google, Google Scholar, PubMed and PLoS. Some of the key phrases used during the online searches included; "HIV/AIDS financing in Zimbabwe 2009-2013"; "Effects of HIV/AIDS financing on health outcomes in Zimbabwe"; "HIV/AIDS services, incidence and mortality rates in sub-Saharan Africa" and "Impact of HIV/AIDS financing on HIV incidence and mortality rates".

Descriptive variables

Information extracted from National AIDS council included HIV incidence and mortality rates. Yearly rates of both variables were recorded on the data matrix table for analysis. Information on HIV/AIDS financing was recorded from Ministry of Health, Ministry of Finance, UN and World Bank publications.

Statistical Analysis

A secondary analysis of published data between 2009 and 2013 provided information on HIV/AIDS financing trends and HIV incidence and mortality rates in Zimbabwe. Data were used to calculate degree of association using Pearson's product moment correlation coefficient, linear regression to determine the coefficient of variation and student t test to calculate p-values to determine statistical significance. STATA version 12 was used in all statistical analyses. This

study did not require ethical approval because it used publicly available data.

RESULTS

The table below shows the trends in HIV/AIDS financing, HIV incidence rate and absolute HIV related mortalities in Zimbabwe from 2009 to 2013. There was a significant increase in HIV/AIDS financing of 323 %, while HIV incidence rate increased by 51 % from 2009 to 2011, and dropped by 24 % from 2011 to 2013. HIV-related mortalities increased by 74 % from 2009 to 2011, and decreased by 47 % as from 2011 to 2013.

Table 1 Trends in HIV/AIDS financing, HIV incidence and mortality in Zimbabwe from 2009 to 2013

Year	HIV/AIDS financing (US\$million)	HIV incidence rate (%)	HIV mortality (000)
2009	60	0.85	66
2010	134	0.96	85
2011	198	1.29	115
2012	254	1.25	87
2013	262	0.98	61

There were significant increases in HIV/AIDS financing between 2009 and 2013. HIV incidence and mortality rates increased from 2009 to 2011 and then dropped from 2011 to 2013

HIV/AIDS financing and HIV incidence rate

There was weak positive linear correlation between total HIV/AIDS financing and HIV incidence rate in Zimbabwe post dollarization up to 2013. The correlation coefficient was +0.63, however, the linear relationship was statistically insignificant ($p=0.26$). The coefficient of determination (R^2) between the variables was 0.4, which means that 40% variation in HIV incidence rate was explained by variation in total HIV/AIDS financing. The greatest variation (60%) was due to other factors independent of total financing such as political, socio-economic, and health system factors. HIV incidence rates are likely to be hugely influenced by sexual behaviour of citizens, access to health care and income levels.

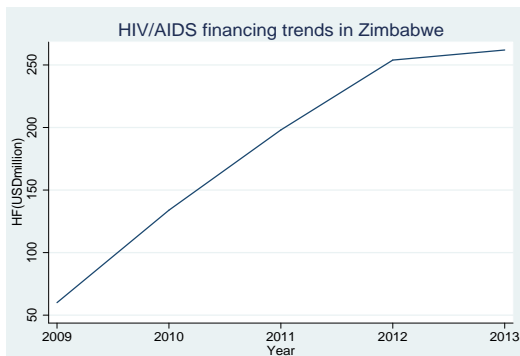


Figure 1 HIV/AIDS financing (HF) trends over the period 2009-2013. There was a significant increase in HIV/AIDS financing between 2009 and 2013 in Zimbabwe. However, HIV/AIDS financing started to plateau from 2012 to 2013

HIV/AIDS financing and HIV mortalities

There was very weak positive correlation between total HIV/AIDS financing and HIV related deaths. The correlation coefficient r was +0.15 showing a very poor linear relationship between total HIV financing and HIV related mortality ($p=0.81$). The coefficient of determination (R^2) was 0.02, meaning that only 2 per cent variations in HIV related

deaths was explained by variation in total HIV/AIDS financing over the five year period (2009-2013). Ninety eight per cent variations were due other factors independent of financing. HIV related deaths are likely to be influenced by social factors such as access to service delivery of health care, availability and distribution of health professionals, availability of essential medical products and technologies, quality of lifestyle which is a result of income levels as well as biological factors.

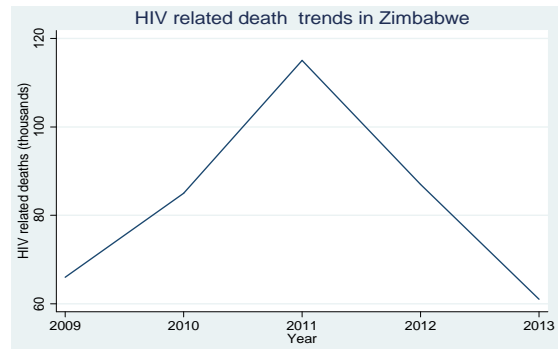


Figure 2 HIV-related deaths trends in Zimbabwe, 2009-2013

There was a significant increase in the number of HIV related deaths in Zimbabwe from 2009 to 2011, while the deaths decreased significantly from 2011 to 2013

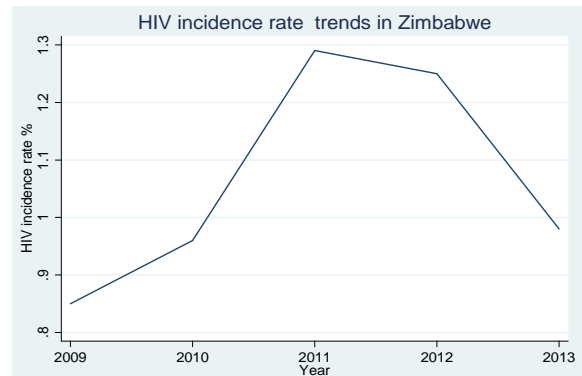


Figure 3 HIV incidence rate trends in Zimbabwe from 2009 to 2013

HIV incidence rates increased significantly from 2009 to 2011, and decreased from 2011 to 2013

DISCUSSION

HIV/AIDS financing trends: 2009-2013

They were significant improvements in HIV/AIDS financing after the dollarization of the Zimbabwean economy. This was evidence of macroeconomic stability in Zimbabwe after the formation of the Government of National Unity in Zimbabwe in 2009 [MoF, 2010; Nac, 2013]. This shows that a stable political, economic and social environment is crucial for improved health financing in Zimbabwe. While the AIDS Levy (general revenue) contributed 13 per cent of the total HIV/AIDS financing, 87 per cent of the funding came from global partners. This demonstrates that HIV/AIDS programmes are still being largely funded by donors. This presents challenges of sustainability of programmes should there be donor apathy [Bendavid *et al.*, 2010; Katz *et al.*, 2013].

The willingness of donors to support disease specific interventions is subject to several factors such as political in the form of international relations, economic stability in donor

countries as well as perception of the recipient country by donor organizations or governments [Sridhar & Gomez, 2010].

The improvements in HIV/AIDS financing were also in tandem with the sharp increases in economic growth as measured by GDP which rose from USD 5.6 billion in 2009 to about USD10.3 billion in 2013 [MoF, 2009-2013; NAC, 2010]. The GDP also shows growth in the Zimbabwean economy that followed the dollarization of the economy, however, the economy still remain faced with multiple challenges that impact negatively on HIV/AIDS financing if not addressed soon. These challenges include under capitalization of industries, de-industrialization due to government policies, increasing unemployment and the mushrooming of the unregulated informal sector which contributes little to the fiscus [Nyazema, 2010; NAC, 2010]. The trend shown in this present study proves that economic growth is crucial for improved HIV/AIDS financing regardless of the sources of the financing.

The increase in HIV/AIDS per capita expenditure in Zimbabwe after dollarization of the economy from US\$66 in 2009 to US\$191 in 2013 demonstrates significant achievements in HIV/AIDS financing. Although most of the funds are still coming from donors, these investments are positive developments in combating the retroviral disease. However, there is still a huge gap in HIV/AIDS financing to ensure adequate funding of preventive, care and treatment programmes in Zimbabwe. While the average HIV/AIDS per capita expenditure between 2009 and 2013 was US\$146, the average expenditure on HIV treatment alone in a multi-country analysis involving Zambia, Rwanda, Ethiopia, South Africa and Malawi in 2012 was USD303 [CHAI, 2012]. In the same study Zambia, Malawi and Rwanda had treatment per capita expenditures of US\$278, \$136 and \$232 respectively. This shows that Zimbabwe still need significant investments in HIV/AIDS programmes to reach regional average expenditure levels. The UNAIDS average ARV expenditure per person for low income countries like Zimbabwe was slightly above US\$250 [Maddison & Schlech, 2010], indicating that Zimbabwe still has a huge HIV/AIDS financing gap in order to reach the low income countries' average. This gap may be widening due to the adoption of the 2013 WHO guidelines by MOHCC as well as the implementation of the Option B plus programme [NAC, 2010].

The 2013 WHO guidelines recommended the initiation of ARV treatment in patients with CD4 count less than 500 cells/ul and the MOHCC has recently adopted this as a national health policy (Doherty *et al*, 2013; Tapera, 2014). The Option B plus policy stipulates the initiation for life of HIV positive pregnant mothers regardless of their CD4 counts. These policies will result in huge increases in the number of people requiring ARVs and since these drugs are given for life the expenditure for them will also have to increase by a large margin if these two recent policies are to be effective. Hence, HIV financing is a critical area that the government and its global partners need to address to ensure sustainable programmes in the country.

Ministry of Health budget allocations have been increasing

steadily and in 2009, the ministry was allocated US\$120 million and in 2013, US\$381 million [MoF, 2009-2013]. Although the actual expenditure may have been lower than these figures, the allocations worked as policy instruments to attract donor funding in the health sector particularly in HIV/AIDS, TB and malaria programmes in line with UN MDGs. As the economy grew, more funds were allocated to the health ministry indicating the government's prioritization of healthcare. The HIV/AIDS per capita expenditure in Zimbabwe grew from US\$66 in 2009 to US\$191 in 2013. This was a 290 per cent increase in HIV/AIDS per capita financing, which was significant. This huge increase in financing was accounted to various factors mainly the huge increases in AIDS levy collections as opposed to 2007-2008 when virtually nothing was collected by the Ministry of Finance [Barros *et al.*, 2011]. There was also increased commitment by global partners like UN agencies, PEPFAR (USG), ESP, Global Fund amongst other donors. The introduction of the Health Transition Fund (HTF) to raise US\$436 million and Health Sector Investment Case to lobby for US\$700 million by the GOZ to fund the health system in the post dollarization era were crucial policies that explain the improved HIV/AIDS financing in the period 2009 to 2013.

GOZ HIV/AIDS financing patterns

The National AIDS Council, which is the custodian of the AIDS levy and is responsible for in-country HIV/AIDS prevention, care and treatment programmes collects and distributes funds to various thematic areas. The organization collected a total of US\$119 million from 2009 to 2013 [NAC, 2013]. This amount is the 3 per cent of the taxable income of all employed people in the country in the period 2009 to 2013. There were significant increases in revenue collection by the Ministry of Finance between 2009 and 2013, and as such the expenditure in various thematic areas of NAC also increased to ensure adequate HIV/AIDS responses in the country. An average of fifty five per cent of the AIDS levy was spent on care and treatment programmes. The remainder was spent on advocacy, mitigation and counselling and home based care thematic areas.

There were increases in expenditure in all the thematic areas except in 2013 where there was a huge decline in expenditure in the counselling and home based care thematic area. This could be explained by the increases in expenditure in response to need in the HIV/AIDS programmes. The decline in counselling and home based care thematic area could be due to programmatic dynamisms in HIV/AIDS responses in the country. Of the 55 per cent expenditure in the care and treatment thematic area, 85 per cent was spent on ARVs alone. This shows that most of the expenditure from the AIDS levy is still going towards ARVs which are imported from other countries. In 2013, of the USD18.4 million allocated to care and treatment programmes, USD15.7 million was taken by ARVs alone [Nyazema, 2010]. Given that more people will need ARVs due to the changes in WHO guidelines and the introduction of the Option B plus programme in 2013, this amount could be meagre to cover the ARVs needed by the nation, leaving most of the people in need of ARVs at the mercy of donors or out-of-pocket funding. These two sources of financing have challenges of sustainability given that ARVs are given for life and that out-of-pocket funding of healthcare has catastrophic implications on households in

developing nations [WHO, 2001; Witter, 2005; Bendavid, 2010; Zulu *et al.*, 2011]

HIV incidence rate

There was an increase in HIV incidence rate from 2009 -2011 and it declined to 1.25 per cent in 2012 and it further dropped to 0.98 per cent in 2013. The increases in 2009-2011 could be due to vulnerabilities imposed by harsh macroeconomic conditions in the pre-dollarization period which could have driven women into prostitution and early marriages. Poverty could also have reduced health seeking behaviours resulting in vulnerabilities to the HIV infection [De Vogli&Birbeck, 2005; Peters *et al.*, 2008; Anell *et al.*, 2012]. Migration could also have impacted on the HIV incidence rate as more people were flocking back into the country after the formation of GNU in 2009. The migrating population could also have contributed to the increases upto 2011 [De Vogli&Birbeck, 2005; Fox, 2010; 2012].

However, the various HIV/AIDS programmes implemented by the government and its global partners on the background of improved HIV/AIDS financing could also have impacted on the decline in incidence rate from 2011-2013. The linear association between HIV/AIDS financing and incidence rate was poor ($p=0.26$), implied that the major factors to HIV incidence rate variations were not economic but social [Ibid]. Therefore, improving HIV/AIDS financing might not necessarily tame the HIV transmission directly in itself but might complement programmes targeted at influencing behaviour change in Zimbabwe. Although there was no significant positive linear association between HIV incidence and improved health financing, this does not necessarily imply no association at all as there could be other non-linear relationships between the variables under study. Improved health financing still remains crucial as behaviour change interventions and access to health care are influenced by financing [Anderson *et al.*, 2000; Atagura& Akazili, 2010]. The effectiveness and efficiency of social interventions such behaviour change advocacy, distribution of condoms and male circumcision are directly influenced by health financing and with little or no funding HIV incidence would increase.

HIV related deaths

In Zimbabwe, HIV related deaths increased from 2009-2011, and then it started to decrease to about 61,476 deaths by 2013. This shows a significant decrease from 115,117 deaths in 2011. The increases from 2009 to 2011 could be due to the poor care and treatment programmes in the 2007-2008 when the health system had virtually collapsed [Mason, 2009; Nyazema, 2010]. Lack of ARVs and other drugs in the health centres, as well as poor nutrition amongst other challenges faced prior to dollarization could also have influenced the increase in HIV related mortality [Anderson *et al.*, 2000; Anyangwe *et al.*, 2006; Fox, 2012]. However, with improved financing and subsequent health systems strengthening following political and economic stability the number of HIV related deaths began to decrease from 2011 to 2013. There was no linear relationship between total HIV/AIDS financing and HIV related deaths ($p=0.81$). This does not necessarily mean that the two variables are not related in anyway. Health financing may influence HIV related mortality through other

health systems components such as medical products and technologies, service delivery, human resources for health, health information systems and governance. Although improved health financing is generally associated with improved health outcomes [Anderson *et al.*, 2000; Atagura& Akazili, 2010], HIV related deaths are also subject to socio-economic factors. Income levels, access to healthcare and quality of health care influence the variable hence improving financing does not necessarily result in a decrease in HIV related deaths.

CONCLUSIONS

Despite the common rhetorical attention given to the relationship between health financing and health outcomes, this study shows that the relationship between these variables is oversimplified. These simplistic assumptions that improving HIV/AIDS financing will translate into improved health outcomes are now increasingly being brought under closer investigation in the contexts of developing countries. Contemporary evidence suggests that developing countries are faced with increasing burdens of both infectious and non-communicable diseases against a background of tightening donor funding. This presents sustainability challenges to health care interventions.

It then calls for health reforms meant to strengthen primary health care systems and increase efficient utilization of scarce financial resources. The integration of disease-specific interventions with the health system is an imperative policy that would need urgent attention if health outcomes are to improve significantly in the post-MDG era. Donor funded initiatives should be welcome however; such programmes should be aligned with the health system. Synergistic interactions should be in-built in these interventions in order to ensure that health systems are not weakened along the way. Political will which culminates in good leadership and governance in healthcare service delivery should be promoted. Poverty and health inequities should be reduced through stakeholder coordinated activities to reduce vulnerabilities to infectious diseases like HIV/AIDS and other sexually transmitted infections.

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