

# Economic Impact of HIV/AIDS on the Health System in Ndola District, Zambia: Healthcare Workers' Perceptions

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## Abstract

**Background:** In 2016, the prevalence of HIV among Zambian adults aged 15 to 59 years was 12.3% (14.9% among females, 9.5% among males). Among people living with HIV and know their HIV status, 85.4 percent are currently on Antiretroviral therapy (ART). However, according to our knowledge, no study had been conducted to assess the economic impact of HIV/AIDS on the health system in Ndola district.

**Methodology:** A descriptive cross section study comprising 66 randomly selected healthcare workers working in ART centres in the government health facilities in Ndola District on the Copperbelt province, Zambia was conducted from August to October, 2013. Data was collected using standard questionnaires. Ethical clearance was sort and obtained from both University of Limpopo, Medunsa Campus Ethics Committee and Tropical Diseases Research Centre. Data was entered and analyzed using SPSS version 20.0 statistical software. Univariate statistics was performed.

**Results:** More than half (66%) of healthcare workers are formally trained in ART services. The majority (97%) of healthcare workers perceived an increased demand for ART services and most (85.3%) of them perceived an increase in the cost of training healthcare workers in HIV/AIDS skills. Most (81.8%) healthcare workers perceived an increase in employment of HIV/AIDS support staff and 96.9 % perceived an increase in the use HIV/AIDS drugs.

**Conclusion and recommendation:** Our study has shown that increased HIV/AIDS burden in Ndola district has an economic impact on the health system mainly due to increased costs of managing HIV/AIDS patients. We recommend more research focusing on evidence based HIV preventive measures to mitigate the phenomenon's economic impact on health system.

**Keywords:** Economic impact, HIV/AIDS, Health System, Perceptions, Healthcare workers.

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## Background

Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) emerged more than 30 years ago. It is no longer just a major health threat issue but an economic threat issue that is draining on merger resources such as human resource and money. Investments in prevention and Antiretroviral therapy (ART) are yielding results as reported in steady decline in the pandemic such that by the year 2016, there was 48% decline in deaths from AIDS-related causes, from a peak of 1.9 million [1.7 million–2.2 million] in 2005 to 1.0 million [830 000–1.2 million] (UNAIDS, 2017.) As of the year, a record total of 21.7 million were commenced on ART world wide and AIDS related deaths reduced to less than 1 million dying each year (UNAIDS, 2018). As of 2017, of the total 36.9 million people living with HIV/AIDS worldwide, the majority (53%) where from Eastern and Southern Africa regions of which Zambia is part. About 12.9 million people from this same region were accessing ART. In addition, about US\$ 10.6 million has been invested in HIV programs in the region (UNAIDS, 2018).

In Zambia, even though the trends for HIV prevalence been reducing from 14 % in 2007 to 13 % in 2014 and 12.3 in 2016 among adults aged 15–49 years old with 2016 HIV prevalence of 14.9% among females and 9.5% among males, the prevalence is viewed by government as still unacceptably high. And among these people living with HIV (PLHIV) and know their HIV status, 85.4% are currently on Antiretroviral therapy (ART) (Central Statistical Office (CSO), 2009; CSO; Ministry of Health (MOH) Zambia and ICF International, 2014; Zambia Population-Based HIV Impact Assessment [ZAMPHIA], 2016). The Copperbelt province has the third highest HIV prevalence of about 14.2% among adults aged 15 and 59 years old (ZAMPHIA, 2016). These numbers and investments in HIV/AIDS management aimed at reducing the incidences of new infections, treatment and caring for people suffering from HIV/AIDS in themselves translates that there should be an economic impact on the health system. However, according to our knowledge, no study had been conducted to assess the economic impact of HIV/AIDS on the health system in Ndola district. The thrust of the study was to assess healthcare workers' perceptions on the economic impact of HIV/AIDS on the health system in Ndola district, Zambia.

## Methodology

**Study area and population:** The study was conducted in Ndola district of Zambia and with a population of 455,194 (CSO, 2010:1). Administratively, the District Health Office (DHO) has divided it into Northern, Central and Southern zones and has 8 ART centres with a total of 80 ART healthcare workers. The study was conducted at Ndola Teaching Hospital (NTH), New Masala, Lubuto and Chifubu ART centres.

**Study design:** This was a cross sectional survey employing quantitative methods for data collection.

**Sample size and sampling:** Epi info software version 7 was used to calculate the sample size from the total population (Centre for Disease Control [CDC], 2011, [www.cdc.gov/epinfo](http://www.cdc.gov/epinfo)). Therefore, sample size constituted 66 ART health workers at 95% confidence level. Simple random sampling technique with the help of random sampling tables was utilised to select both participants and the four ART centres.

To minimise selecting more participants from some ART centres, we divided the total number of healthcare workers per ART centre by sum total population for all ART health workers (80) and multiplied it by the sum total sample size (66).

**Data collection:** Data was collected between August and September, 2013 using a standard pre tested questionnaire.

**Ethical considerations:** This was sought and granted by both University of Limpopo, Medunsa campus Ethics Committee, Project No: MREC/H/146/2012: PG and Tropical Disease Research Centre Ethics Review Committee No: TDRC/ERC/04/08/2013. Authorisation to conduct the survey was equally sought from both NTH management and Ndola DHO. Informed consent was obtained from each participant. Confidentiality and anonymity were adhered to.

**Data analysis:** We first manually screened all questionnaires for completeness before being numbered and responses to open questions coded before being entered into Microsoft excel and analysed using IBM SPSS version 20 software. Initial analysis was by generation of frequency distribution tables. Descriptive statistics were used to summarise participant's responses.

### Definitions

**Acquired immunodeficiency syndrome (AIDS):** A chronic, potentially life-threatening condition occurring when there is total breakdown of the body's immune system caused by HIV.

**Economy impact:** Noticeable effect that a phenomenon (HIV/AIDS) has on the particular community and its effect require use of money, time, products, manpower, space, materials and infrastructure that could have been used on other health needs.

**Health system:** An organised set of health services which is in charge of providing healthcare to a particular community.

**Healthcare workers:** All formally trained healthcare professionals in ART management like doctors, nurses, laboratory technologists, pharmacists and psychosocial counsellors.

**Human immunodeficiency virus (HIV):** A viral infection which breaks down the body's immune system leaving someone susceptible to any other infection.

### Results

A total of 66 participants were enrolled in this study at 100% response rate. Table 1 summarises demographic characteristics of the participants. The majority (66.2%) of the participants were females. More than half (56.1%) of the participants were aged between 25 and 39 years old and most of them (54.5%) were nurses by profession. More than three out of four (76.2%) of the participants had been working in ART centers for more than 1 year and the majority (60.6%) of them were formerly trained in ART management.

**Table 1. Demographic characteristics of the participants (n=66)**

Variable	Frequency	Percentage (%)
<b>What is your gender?</b>		
Male	22	33.8
Female	43	62.2
<b>Total</b>	<b>65</b>	<b>100</b>
<b>What is your age group?</b>		
Less than 25 years old	5	7.6

25 – 39 years	37	56.
40 years and above	24	36.4
<b>Total</b>	<b>66</b>	<b>100</b>
<b>What is your occupation?</b>		
Medical doctor	1	1.5
Nurse	36	54.5
Clinical Officer	2	3
Pharmacist	9	9.1
HIV/AIDS Counselor	12	13.6
Laboratory Technology	12	18.2
<b>Total</b>	<b>66</b>	<b>100</b>
<b>For how long have been rendering ART services?</b>		
Less than 1 year	15	23.8
1 year and above	48	76.2
<b>Total</b>	<b>63</b>	<b>100</b>
Have you ever been formerly trained in ART management?		
Formerly trained	48	72.7
Not formerly trained	18	27.3
<b>Total</b>	<b>66</b>	<b>100</b>

Table 2 summarises the economic impact of HIV/AIDS on the Health system from healthcare workers perspective. The majority (97%) healthcare workers perceived an increased demand for ART services. Similarly, most (85.2%) healthcare workers perceived an increase in the cost of training healthcare workers in HIV/AIDS skills. Equally, majority (92.3%) of them perceived shortage of trained healthcare workers to provide HIV/AIDS services. Almost 3 out of 4 (71.2%) healthcare workers perceived frequent hospitalisation and treatment of HIV/AIDS patients with opportunistic infections. The majority (97%) healthcare workers perceived an increase in the ART treatment budgets just like most (95.4%) of them were of the view that there was limited work space in ART clinics due to increase in HIV/AIDS patients.

**Table 2. Economic impact of HIV/AIDS on the Health system–Perceptions of Healthcare workers (n=66)**

Variable	Frequency	Percentage (%)
Is there an increase in demand for ART services by patients with HIV/AIDS?		
Agree	64	97
Disagree	2	3
<b>Total</b>	<b>66</b>	<b>100</b>
There is limited work space in ART clinics following increase in HIV/AIDS patients		95.4
Agree	62	4.6
Disagree	3	<b>100</b>
<b>Total</b>	<b>65</b>	
Is there shortage of trained healthcare workers to provide HIV/AIDS services?		92.3
Agree	60	7.7
Disagree	5	<b>100</b>

<b>Total</b>	<b>65</b>	
Is there an increase in employment of HIV/AIDS support staff e.g. Data clerks and lay Counselors?		
Agree	54	81.8
Disagree	12	18.2
<b>Total</b>	<b>66</b>	<b>100</b>
Is there frequent hospitalisation and treatment of HIV/AIDS patients with opportunistic infections?		
Agree	47	71.2
Disagree	19	28.8
<b>Total</b>	<b>66</b>	<b>100</b>
Is there an increase in the use of HIV/AIDS related drugs e.g. Cotrimoxazole and Fluconazole?		
Agree	64	97
Disagree	2	3
<b>Total</b>	<b>66</b>	<b>100</b>
Is there an increase in ART treatment budget?		
Agree	57	89.1
Disagree	7	10.9
<b>Total</b>	<b>64</b>	<b>100</b>
Is there frequent modification of infrastructure to cater for HIV/AIDS patients?		
Agree	22	33.3
Disagree	44	66.7
<b>Total</b>	<b>66</b>	<b>100</b>
Is there an increase in sick leave seeking behaviour by HIV/AIDS patients?		
Agree	28	43.8
Disagree	36	56.2
<b>Total</b>	<b>64</b>	<b>100</b>

## Discussion

In any nation where HIV/AIDS epidemic is high, it has undoubtedly impacted negatively on the economic aspects of the health system. HIV/AIDS is the most important single cause of disease burden in Southern Africa (UNAIDS, 2012). Our study assessed the economic impact of HIV/AIDS on the health system in Ndola district as perceived by healthcare workers. Healthcare workers in Zambia are the front liners in the provision of ART services to HIV/AIDS patients and therefore have evidence based information on how the phenomenon has economically impacted upon the health system in the district. This view is similar to that held by Hogan and Palmer who states that the more time one has in rendering a services, the better the insight in understanding the phenomenon (Hogan and Palmer, 2005).

The study participants were mainly nurses and females. This finding is a common finding in most health settings in Zambia whereby the majority of the healthcare workers in Zambia are nurses, while doctors are so few such that some districts do not have a single medical doctor. In this regard, this finding may explain why patients on ART still present to the health centres with opportunistic infections because of the skill and knowledge level deficits in managing HIV/AIDS patients. Medical doctors are more skillful and knowledgeable than nurses and as such are able to pick and treat early any opportunistic infection than nurses would do (Cornia *et al.*, 2007, UNAIDS-Zambia, 2011). Additionally, MOH Zambia states that about 64.7% of

all health workers in Zambia are females and majority of them nurses whose majority are equally females (MOH/NAC, 2010). Most of the healthcare workers had worked in ART centres for one year or more. Therefore, the experience held in rendering a service leads to proficiency and more insight as alluded to by Hogan and Palmer who states that the more experience one has in rendering ART services, the better the insight in understanding the phenomenon and the more trust the clients have in the service provider (Hogan and Palmer, 2005). The majority healthcare workers in ART centres are trained and this is in line with MOH-Zambia which state that about 94% of healthcare workers in ART units are trained in HIV/ART service delivery in Zambia (MOH, 2006). This is key because HIV/AIDS management training help improve both the knowledge base and skill of healthcare workers working in ART centres in managing HIV/AIDS patients. Therefore, they have better understanding on the economic impact that has been caused by the HIV/AIDS on the health system in the district (Ama and Seloilwe, 2010).

In addition, healthcare workers working in ART centres in Ndola district perceive that there is an increased demand for ART services by HIV/AIDS patients. This finding is in tandem with the recent report by ZAMPHIA that 85.4% HIV/AIDS patients in Zambia are currently on ART (ZAMPHIA, 2016). Furthermore, these healthcare workers perceived that an increase ART demand has led to limited work space in ART clinics, a fact that even MOH-Zambia have attested to so far that increased demand for HIV/AIDS service being provided had come with added responsibilities, including physical space in most ART centres (MOH, 2005). This has resulted in congestions in these ART centres and has put healthcare workers at risk of contracting respiratory tract infections like tuberculosis. Equally, increased demand ART services has resulted in the shortage of trained healthcare workers to provide HIV/AIDS services as Spicer and Walsh in 2008 attested to in their report on global HIV/AIDS initiatives in Zambia: Issues of Scale up and Health Systems Capacity of 2008 (Spicer and Walsh, 2008).

To try and mitigate the shortage, health centres have been sending their healthcare workers for HIV/AIDS specialist short trainings like adherence counseling, HIV testing and care among others. And as such, this has also resulted in an increased cost of training healthcare workers in HIV/AIDS skills (Spicer and Walsh, 2008). Similarly, more support staff have to be employed so that there is efficiency in HIV/AIDS service delivery. These findings are similar to what Joubert and others in 2007 and Mehta and Gupta in 2006 alluded to that the evidence of the disease burden on the health system is usually noted by financial costs spent on medication, laboratory investigations, training of staff in phenomenon skills, building of infrastructure, increased demand for health services, employment of additional staff to cater for increased patients demands and health costs like time spent treating patients with HIV/AIDS related conditions at the health facility. This therefore shows that large numbers of patients with HIV/AIDS has both direct and indirect economic impact. Directly is on them as infected individuals and indirectly as they turn to health facilities for their treatment (Joubert *et al.*, 2007; Mehta and Gupta 2006). Even though the healthcare workers indicated that there was no frequent modification of infrastructure to cater for HIV/AIDS patients, MOH-Zambia that reported in its 2006 evaluation report on minimum standards for infrastructure, pharmacy and imaging facilities providing ART services that only 38% of the facilities had adequate space for providing such services (MOH, 2006).

In addition, this study has clearly demonstrated that there is frequent hospitalisation and treatment of HIV/AIDS patients with opportunistic infections and in the use of HIV/AIDS related drugs like Cotrimoxazole and Fluconazole. These drugs help prevent acquisition of

opportunistic infections such as *Cryptococcal neoformans*, *neumocystis jiroveci pneumonia* (PJP) (WHO, 2001; MOH, 2005; Cornia *et al.*, 2007). These findings are similar to studies conducted by UNAIDS which reviewed that there was an increased occupancy of bed space in the health institutions especially in SADC region where HIV/AIDS patients occupy more than 50% of all health institutional beds (UNAIDS/ WHO, 2010). This is so because HIV/AIDS patients require longer and frequent hospitalisation than patients with any other diseases mainly due to recurrent treatment of HIV/AIDS related opportunistic infections like tuberculosis (TB), cryptococcal meningitis, diarrhoea, *pneumocystis jiroveci pneumonia* (PJP) and skin conditions like kaposi's sarcoma among others which they acquire due to weakened immunity which fail to contain infections (Mpundu, 2000, Twafik and Kinoti, 2003, WHO, 2001:15; MOH, 2005; Mtalimanja *et al.*, 2017).

Particularly in Zambia in the year 2011, about 70% of all HIV/AIDS patients are co-infected with TB and Kapata and others in their study on the prevalence of TB in Zambia recently reported that the risk of having TB in HIV individuals was five times higher than in HIV negative individuals (UNAID - Zambia, 2011; Kapata *et al.*, 2016). These HIV/AIDS related infections present a huge healthcare burden on the health sector and have caused an increase in their budgets in order to cater for patients on ART treatment as rightly perceived by healthcare workers in this study. This finding is also in congruent with findings found in the neighbouring Botswana in 2010 (Ama and Seloilwe, 2010).

### Conclusion and recommendation

Our study has shown that increased HIV/AIDS burden in Ndola district has economically impact on the health system mainly due to increased costs of managing patients with HIV/AIDS. We recommend more research focusing on evidence based HIV preventive measures to mitigate the phenomenon's economic impact on health system.

### Authors' contributions

EK conceived the study, prepared the protocol, collected data, analysed and interpreted finding, drafted and revised manuscript. PKK supervised conceptualization of the study, protocol preparation, data interpretation and discussion. NM supervised data analysis, interpretation of findings and proof read the manuscript. NMS participated in the conceptualization of the study and protocol preparation.

**Conflict of interest:** None

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