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Comparative Analysis: Cost of Two Community ART Delivery Models In the Urban Settings In Zambia

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Abstract

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In the quest to improve and address the bottle necks of ART services to the affected population, Zambia has implemented three models of delivering this service which are; Standard of Care, Door to Door and Adherence Clubs. The aim of this study was to identify and cost the provision of ART services using the three models. A quantitative retrospective cross-sectional study was done to compare the cost of delivering two models, adherence clubs and door to door in relation to the standard facility-based model. The 2018 costing data for ART was collected retrospectively in the Kanyama and Chipata Health Urban Centers in Lusaka, Zambia. A checklist and a data costing tool was developed to help identify and cost all the costs items attached to the provision of ART services in the two Health Centers. The study shows that the total cost of delivering ART services to 11,225 patients at Chipata Health center was 53,087,649.54 ZMW ($ 4,994,134.48) translating into 21,802.49 ($2,051.03) per patient. Furthermore, providing the same services at Kanyama to 12,293 clients costed 35,823,354.87 ZMW ($ 3,370,023.98) and cost per patient was 24989.65 ZMW ($2,350.86).The study concluded that it was more expensive to deliver ART through health facility model than community-based models. The major costs of ART services using three models of care were ARV drugs followed capital and personnel costs. In order to reduce barriers and costs ART services must be brought close to people as much as possible.

Keywords: *RBF, standard of care, door to door and adherence clubs, ART*

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INTRODUCTION

Zambia is part of the region which is severely affected by HIV/AIDS. The region of Central and Southern Africa which in which the country lies has over the years faced numerous challenges in HIV/AIDS related issues. According to UNAIDS (2017), "The number of people on treatment has doubled since 2010, reaching nearly 10.3 million people" [1] . In Zambia, there has been major scale up of ART which has been hindered by factors such as weak infrastructure, limited human and financial resources. According to Ferrinho [2] , human resource deficits remain high against the targets in the Seventh National Development Plan 2017-2021, for example, Zambia's health force is lower than the acceptable average allowable density threshold is which 2.3 per 1000 population (MoH). Despite increase in university and college enrolments in health-related courses, the shortage of health staff has increased over the years and the trend is expected to continue. This can also be attributed to the rapid increase in population which also call for more health force [3] .

Health is an important aspect of the economy making it an integral part of many policies that are implemented of which some are as a result of international requirements. One such requirement is the UNAIDS guidelines which requires initiation of all adults on ART without regard to the world Health Organization's clinical stage and CD4 cell count thereby increasing eligibility for ART. The rationale behind this is that many people living with HIV access care from public health facilities which is convenient and affordable, however, this has the ability to increase congestion and overstretching of health staff which may act as an obstacle to accessing ART services which may compromise the quality.

The Zambia Demographic and Health Survey of 2018 [4] reports that HIV prevalence among females aged 15-49 years is 14.2 per cent, compared to 7.5 per cent for males of the same age. The study reviewed secondary data by different scholars and noted that despite more than 25 years into the AIDS epidemic and billions of dollars of spending later, there is still much work to be done both on costs and effectiveness to adequately inform HIV prevention planning [5] . Even the available costing information in the region and country level is not well substantiated. In as much as studies conducted in the past follow the laid down procedures, various factors make comparison difficult, further currently very few studies have been conducted in relation to the cost of delivering ART services. According to Menzies et al [6] , the sources of the reports originate from the single or limited sources. This provides limited information about the subject matter and hence the need to calculate the all the costs related to the service for informed decision making at all levels of services delivery from the community to the global level as this as the potential to further promote efficiency through strengthening competitive service delivery.

Consequently, there is need to find ways of improving service delivery that suits the new guidelines, of which one of them is decentralization of ART services through community ART models. Evidence on the economic analysis of these ART alternative models is cardinal in a resource constrained country like Zambia especially in this 'Era of Shrinking Donor Funding'. Donor government funding to support HIV efforts in low- and middle-income countries fell for the first time in 2015, decreasing from $8.6 billion in 2014 to $7.5 billion in the recent years. according to a new report by the Kaiser Family Foundation and UNAIDS[7] . Therefore, an economic cost analysis was designed to comparatively measure the cost of the two community models relative to the standard of care model.

HIV/AIDS, is among one of the world's most severe public health challenge. However, there is a global commitment to put new HIV infections to and end and ensuring that everyone living with HIV has access to HIV treatment. Among the affected countries in Africa is Zambia, However, due to limited resources the provision of ART services faces numerous challenges. One of the strategies has been the implementation of UNAIDS guidelines that has increased eligibility has given rise in the number of people accessing ART services. The implication of this, is that more resources are needed, hence the need to find alternative and sustainable ways of delivering the services. This has led to new ways of implementing HIV interventions in Zambia, which includes taking the services as close as possible in the community. Therefore, information on the economic appraisal of these alternative models is cardinal in a resource-constrained country like Zambia especially in this 'Era of Shrinking Donor Funding' and hence the need to find alternative and sustainable ways of health financing in all areas of which ART is one such expanse. The cost evaluation analysis measured and compared costs and incremental cost-effectiveness of the two community models; Adherence Clubs or Home based ART delivery in comparison to standard of care. In view of this, the study measured the cost of implementing community ART delivery models on health

systems and service delivery at local health facilities and give implementers and policy makers information on optimal service delivery and resource allocation in resource-limited settings like Zambia.

METHODS AND MATERIALS

Design

This was a quantitative study of cost evaluation of community ART delivery models namely Adherence clubs and Door to door ART models in Kanyama and Chipata Community as well as the Facility ART model. It was a retrospective cross-sectional study to compare the cost of delivering the two models from the providers as well as the standard model.

The study costed 35 adherence clubs, 35 home based deliveries community ART based strategies which were implemented in the 35 randomly selected zones out of 54 in Chipata and 50 in Kanyama for the main study.

Data collection

A check list was used to collect ART facility related costs which included capital, recurrent and overheads costs. Data collected at the health centre was further entered in a costing tool which was developed using excel. Resource utilization data was collected in the Community ART study using a check list. The key resource items for the Community ART model included ARVs, equipment, materials, and personnel. Cost estimates was collected for each of the resource items identified from the case report forms and study records. The costing exercise covered two broad categories, the running costs which includes the personnel, ARV, supplies costs, the indirect costs, personnel costs, utilities and travel costs. All cost data is presented in Zambian Kwacha and US dollar at the rate of 10.63 this is because data being costed is for the period of 2018.

Data Analysis

Data was entered and cleaned in a costing data tool in excel. The Patient specific cost was estimated by using patient resource and the unit cost estimates to generate a patient specific cost estimate. The costs per patient was calculated separately for each model.

RESULTS

Table 1 shows the cost of delivering ART. At Chipata Health Centre, the cost of delivering ART to 414 patients through adherence clubs is 22,255 ZMW ($2103.038) per patient. At Kanyama the cost per patient is a bit higher at 25,518.23 ZMW ($2,400.59) despite the total cost being lower. This could be due to lower number of patients. Below are the costs of delivering ART services using the three models.

Table 1: Table: 1: The costs of delivering ART services using Adherence Clubs

	ART clubs model		
	Total costs	Number patient	cost per patient
Chipata	9,255,091.227 ZMW	414	22,355.29 ZMW
Kanyama	9,390,707.058 ZMW	368	25,518.23 ZMW

Table 2 shows the costs of delivering ART services using door to door in the two health facilities. The results indicate that the total cost of providing ART using this model to 438 at Chipata Health centre was 9,799,508.36 ZMW ($ 921,872.85) and the cost per patient was 22,373.31($2,104.73) whilst at Kanyama Health Centre the total cost a was 10,564,545.44 ZMW and the cost per patient was 25,580.01 ZMW ($2,406.40) to deliver ART services to 413 clients

Table 2. The cost of delivering ART using Door to Door

	Door-to-Door model		
	Total costs	Number patient	cost per patient
Chipata	9,799,508.36 ZMW	438	22,373.31 ZMW
Kanyama	10,5645,45.44 ZMW	413	25,580.01317 ZMW

The health facility model is one the most common channel of delivering ART services. This study estimated the cost of delivering ART services at the two Health Centers. Table 3 shows that the total cost of delivering ART services to 11,225 patients at Chipata Health centre was 53,087,649.54 ZMW ($ 4,994,134.48) translating into 21,802.49 ($2,051.03). Furthermore, providing the same services at Kanyama to 12,293 clients costed 35,823,354.87 ZMW ($ 3,370,023.98) and cost per patient was 24989.65 ZMW ($2,350.86). All the costs were annualized and a dollar rate of $10.63 was used based on the rate as at 2018.

Table 3: The cost of delivering ART model using the Health Facility

	Standard model		
	Total costs	Number patient	cost per patient
Chipata	53,087,649.54	11,225	21,802.49
Kanyama	35,823,354.87	12,293	24,989.65

Figure 2 shows the capital costs associated with ART services at Kanyama and Chipata Health Facility which are building, storage and equipment. These are the costs needed to bring the ART services to operable status. The figure indicates that at Chipata and Kanyama facility, the capital costs were 359,778.60 and 544,381.36 respectively. While at its adherence and door to door community models the costs were 2,690.58 and 2,389.56 for Chipata and Kanyama respectively. For Kanyama Health Facility, the costs of delivering ART services using Door to Door were 2,848.85 and 2389.56 for Chipata Health Facility

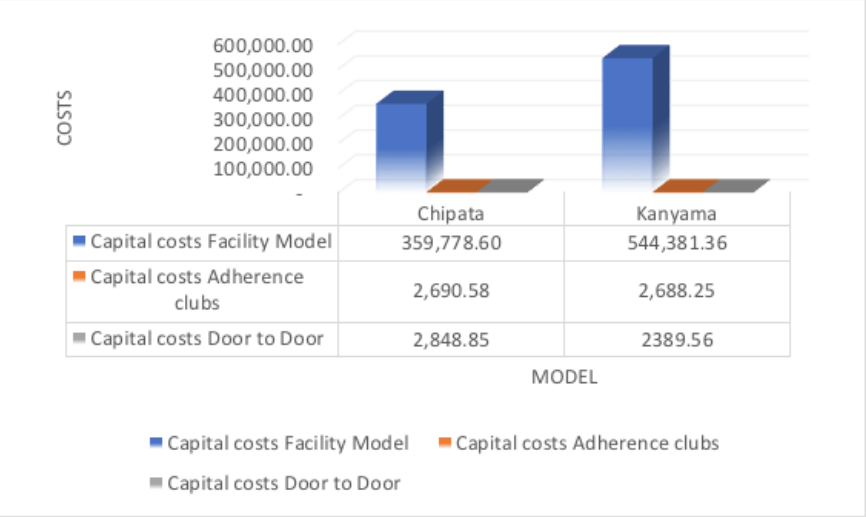

Figure 2 Total Capital Costs

Figure 3 shows total recurrent costs include drugs and supplies, salaries, and other operational costs for which includes electricity, running water, maintenance, incurred on a regular basis that were allocated as direct or indirect costs. As shown in the graph, facility model has the highest recurrent costs at 52,727,870.94 ZMW for Chipata and 35,278,973.51 ZMW. There are no significant

differences between the two community models across each health facility but Kanyama has higher costs for delivering both community models.

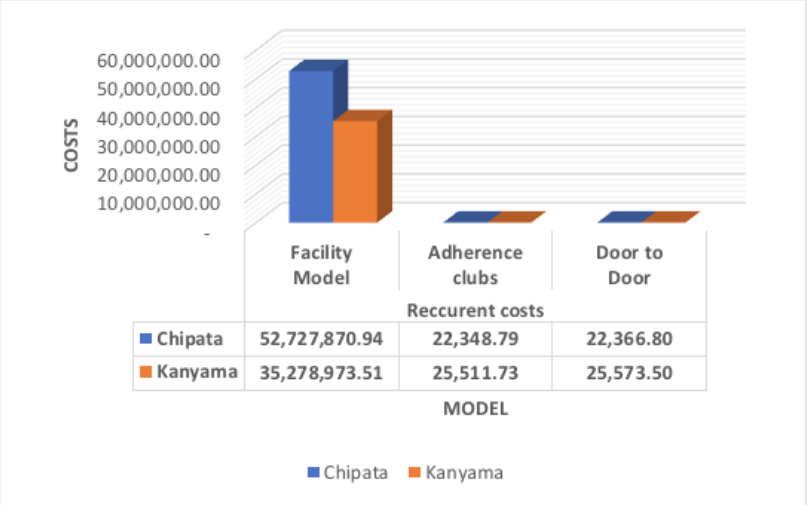

Figure 3 . Recurrent costs per model

Generally, anaemia

DISCUSSION

This section presents discussion and interpretation of the results. The section will also give an insight of the issues that have been identified from this study and will compare with other similar studies. The study measured the cost of implementing community ART delivery models on health systems and service delivery at local health facilities and give implementers and policy makers information on optimal service delivery and resource allocation in resource-limited settings like Zambia. It was a quantitative retrospective cross-sectional study that did a cost evaluation of community ART delivery models namely Adherence clubs and Door to door ART models in Kanyama and Chipata Community as well as the Facility ART model. The study costed 35 adherence clubs, 35 home-based deliveries community ART based strategies which were implemented in the 35 randomly selected zones out of 54 in Chipata and 50 in Kanyama for the main study.

The costs of delivering ART using this model was cheaper than the delivering ART services at the health facility. The capital and personnel costs made this model cheaper. However, the costs of drugs still remained high. This is similar to the other studies conducted in other parts of Africa. According to Ashmore [8] , adherence clubs are cost - effective compared to Standard of care, and they have the potential to improve accessibility to ART. This evidence is supported by the fact that the patients take turns in picking drugs. Besides, when patients are in adherence clubs, it is a good opportunity for them to support each other psychologically. Another study conducted revealed that the average cost of human resources expenditure per patient is lower at community distribution points than at the clinic, while transport costs for patients are about three times lower compared with hospital - based care[9] . There are also considerable time savings: patients at the community ART distribution points spend an average of 14 min collecting ART refills compared with 85 min at the hospital[10] . Nonetheless in as much as it is encouraged for the patients to belong to these clubs, the community and other stakeholders must ensure that challenges such as stigmatization do not become a barrier to accessing ART services in these communities. If this is not taken care it will defeat the purpose of decentralizing the ART services.

Delivering ART services using door to door is one of the most convenient models as patients do not need to move in order to access ART services. This model has demonstrated that it is equally cheaper to use this model compared to the standard of care though the costs are similar to the costs of using adherence clubs. Patients' adherence was improved with low-cost and easily implemented interventions using existing health facilities' resources [11] . This model is very convenient from both the providers' and patient's perspective. However, the stock levels at the health facilities must be maintained to ensure sustainability of this model and patients must equally play their role by ensuring that they take their drugs. This is because it would defeat the purpose if patients cannot play their role and

hence the need to integrate adherence counselling in door to door ARVs. The patients also escape the costs of accessing ART services using other models. This is also evident in some studies conducted which revealed patients' financial and time costs associated with frequent clinic visits were reduced and social support and improved adherence to treatment is well established [12] .
This study revealed that it was more expensive to deliver ART services using the facility putting into consideration the capital and the recurrent costs attached to this model. Similar studies on patient costs revealed that on average, patients spent more time waiting for care at facilities than the time they spent traveling to them. This was particularly evident among level 2 and 3 hospitals and urban health centers [13] .

One key observation concerns operational efficiency. Despite the large operation costs and capital outlay at both facilities, the cost per visit was low because most of the resources are shared, and overheads are spread over a large number of ART services activities. This study observed that in public hospitals, the ART clinic was a unit located within the health clinic among other departments, which lead to a small share of overheads. Thus, the overall cost of accessing ART care per patient case is subject to economies of scale. ARVs accounted for the highest cost for delivering ART services both at the facility and the community. This can be attributed to the fact that many developing countries cannot afford to manufacture the drugs hence drugs are mostly donor funded. This huge cost needs to be managed in a manner that can ensure sustainability of the three models of which in the absence of it will continue to encourage dependency on the western world.

The vital policy consideration that emerged from the secondary analysis is to understand the cost burden of people living with HIV/AIDS and the financial coping mechanism put in place to address the illness. The findings from this study show that ART services have financial and economic impact on the patients and their families in one way or another, which affect health seeking behavior [14] . The key factors attributed to this were long waiting time and transport related costs. Because of this, patients would prefer to join adherence clubs or utilize Door to Door in order to reduce transport costs and waiting time that can be used for other productive. These innovations are some of the channels that seek to mitigate the financial and economic costs of ARVs services in the country. This would be of great help to the patient in an event that one is breadwinner. One of the key aspects of these interventions is social networking as it one channel that can be used to reduce the costs associated with delivering ART services and hence Adherence clubs if well-coordinated can be used as a channel of addressing this challenge. Therefore, there is need to explore this further to understand the extent of economic and financial challenges that come as a result of accessing ART services using either from the provider's perspective or the patient perspective. However, in as much as the costs of delivering ART services must be reduced from both ends it is equally the responsibility of patients to play its role in the reduction of the costs, for example if patients maintain their clinical appointments, they will be cost saving in that the resources that could have been channelled to implement lost to follow up can be used for other needs.

The findings in this study compare relatively well with some findings from studies done in similar settings. According to UNICEF [15] , it was projected that ARVs contributed to a major portion of ART costs to facilities, resulting in an estimated average of 1,418 kwachas ($266) per ART patient each year. On average, ARVs accounted for 68% of annual ART costs at facilities [16] . Zambia still averaged a higher annual cost per patient than Kenya and Uganda, but the relative magnitude was lower. This study suggested that projected ARV costs account for a larger proportion of facilities' annual ART costs in Kenya and Uganda than in Zambia. These findings are particularly important for ART program financing, as funding for ARVs and non-drug facility services often originate from different sources. This is a demonstration that ARVs will still remain to be a huge cost across globe as scale up of ART services continues. Nonetheless, other strategies that aim to reduce costs of delivering ART services indirectly can be implemented such as task shifting.

In a study conducted in Uganda, according to Waliggo [17] , ARVs accounted for the majority of the total cost, followed by personnel and operational costs. This is equally the case in this study because whichever model you decide to implement these costs cannot be done away with.

CONCLUSION

The results indicate that provision of ART services is more expensive at the Health Facility compared to the community ART models. Nevertheless, ARVs in both cases are the major costs that are associated to the delivery of ART services in urban settings in Zambia. In the quest to seek health services, patients equally incur

costs and the results show that transport is the major costs that are incurred by the patients. Results demonstrate that patients waiting time at the Health facility is high which leads to the loss of productive time similarly this is made worse by the fact that patients still spend time to get to and from the facility. It is therefore imperative that the future financial and economic assessments of delivering ART services are considered with outmost importance as this is key in making informed decision that can be benefit the country and the globe at large. This is because there is need to find a more innovative strategy that minimizes costs but still ensures quality in the process. Moreover, the three models would best thrive if they are used concurrently as all of them have different advantages and disadvantages when the costs are compared. It is for this reason that we conclude that in as much as it is cheaper to deliver ART services in the community the three models must be integrated to in a manner that ensures maximum utilization at the minimal cost.

DECLARATION

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REFERENCES

1. UNAIDS, Sub-Saharan Africa makes most progress against HIV. UNAIDS Miles to go—closing gaps, breaking barriers, righting injustices 2017 Report South Africa, 2017. https://www.health24.com/Medical/HIV-AIDS/News/sub

2. Ferrinho P, Siziya S, Goma F, Dussault G. The human resource for health situation in Zambia: deficit and maldistribution. Human Resource Health. 2011; 9:30. V.9:2011 Published 2011 Dec 19. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3283521/

3. Makasa, E, The Human Resource crisis in the Zambian Health Sector – a discussion paper Medical Journal of Zambia, 2009, volume={35}, pages={81-87}

4. Zambia Statistics Agency, Zambia Demographic and Health Survey, 2018. Lusaka

5. Omar, G; Colchero, M; et al, HIV prevention cost-effectiveness: A systematic review. BMC public health, 2015. 10.1186/1471-2458-9-S1-S5

6. Menzies NA, Berruti AA, Blandford JM. The determinants of HIV treatment costs in resource limited settings. Plus One Journal 2013 v.7 (11) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3492412/

7. Kates J and Wexler A, Financing the Response to AIDS in Low- and Middle-Income Countries: International Assistance from Donor Governments. UNAIDS/ Kaiser Family Foundation 2015, https://www.kff.org/report-section/

8. Bango, F; Ashmore, J; Wilkinson, L; et al, Adherence clubs for long-term provision of antiretroviral therapy: cost-effectiveness and access analysis from Khayelitsha, South Africa. Tropical Medicine & International Health; 2016 Volume 21, Issue 9. https://onlinelibrary.wiley.com/doi/full/10.1111/tmi.12736

9. Bemelmans M, Saar B, Eric G. Lynne W, Community-supported models of care for people on HIV treatment in sub-Saharan Africa. Tropical Medicine and International Health, 2014, volume 19, https://onlinelibrary.wiley.com/doi/pdf/10.1111/tmi.12332

10. Bemelmans M, Saar B, Eric G. Lynne W, Community-supported models of care for people on HIV treatment in sub-Saharan Africa. Tropical Medicine and International Health, 2014 volume 19, https://onlinelibrary.wiley.com/doi/pdf/10.1111/tmi.12332

11. Kayiwa J Obua C, Waako P, Improving adherence to antiretroviral treatment in Uganda with a low-resource facility-based intervention. Global Health Action. 2014; 7:24198. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4049133

12. Rueda N, artinson N, Mohapi L, Bakos D, Gray GE, McIntyre JA, Holmes CB. Costs of providing care for HIV-infected adults in an urban HIV clinic in Soweto, South Africa. Journal of Acquired Immune Deficiency Syndromes 2012, V 72. 1. 10.1097 https://journals.plos.org/plosone/article?id=10.1371/journal

13. Dutta, A; Barker, C and Kallarakal, A , The HIV Treatment Gap: Estimates of the Financial Resources Needed versus Available for Scale-Up of Antiretroviral Therapy in 97 Countries from 2015 to 2020. 2015 Volume 12 (11) . Published online 2015 Nov 24. doi: 10.1371/journal.pmed.1001907

14. Nannungi, A; Wagner, G and Ghosh-Dastidar B, The Impact of ART on the Economic Outcomes of People Living with HIV/AIDS. AIDS Research and Treatment. 2013 Volume 2013 |Article ID 362972 | https://doi.org/10.1155/2013/362972

15. Institute for Health Metrics and Evaluation (IHME) (2014) Health Service Provision in Zambia: Assessing Facility Capacity, Costs of Care, and Patient Perspectives.2014 Seattle, WA: IHME

16. Dutta, A; Barker, C and Kallarakal, A , The HIV Treatment Gap: Estimates of the Financial Resources Needed versus Available for Scale-Up of Antiretroviral Therapy in 97 Countries from 2015 to 2020. 2015 Volume 12 (11) . Published online 2015 Nov 24. doi: 10.1371/journal.pmed.1001907

17. Waliggo S, Zieman B, Jani N, Buzaalirwa L, Okoboi S, Okal J, Borse NN, Kalibala S "Annual cost of antiretroviral therapy among three service delivery models in Uganda." Journal of the International AIDS Society vol. 19,5 20 Jul. 2016, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4956730/