



Societal cost of the Mother-to-Child transmission of HIV/AIDS in Ethiopia: urban high HIV prevalence versus rural low HIV prevalence settings

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**AfHEA's 4th Scientific Conference
Rabat, Morocco, Sep 26 – 30, 2016**



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Background

- Since 1980's the impact of HIV/AIDS on the society has been devastating (Piot et al., 2001, Piot et al., 2007, UNAIDS, 2012a).
- Globally in 2015, 36.7 (34.0–39.8) million people were living with HIV/AIDS, 2.1 (1.8–2.4) million were newly infected with HIV, while about 1.1 (940,000–1.3) million died of HIV/AIDS (UNAIDS, 2016).
- New HIV infections in 2015 were 5% lower as compared to the 2010 infections (UNAIDS, 2016).



Access to antiretroviral treatment has had a significant impact on results.

Background...

- **Resource allocation** has become a critical question.
 - Globally USD 9.0 to USD 9.2 billion required for the HIV/AIDS interventions (Marseille et al., 2002; Schwartländer et al., 2001)
 - Half of the resources would be needed in SSA countries (Schwartländer et al., 2001).
 - One-third to one-half of the annual estimated (USD 9 billion) would be expected to be financed from the domestic resources.
 - Most of the LMICs countries contributed only between <0.05% and 1.9% of their GDP for HIV/AIDS response, suggesting the need for a substantial external funding support (up to 87%) (Resch et al., 2015).
- The recent economic crisis and downturn affected the antiretroviral treatment programs (World Bank, 2009).
- Threaten the long-term sustainability of the maternal and child health program in SSA



Background and Research Problem...

Ethiopia:

- Second most populous nation in Africa. (94.1 million, 2013)
- One of the 22 countries targeted for the elimination of new HIV infection among children by 2015 (UNAIDS, 2015)
- GDP per capita of \$410. (WB, 2013)
- National HIV prevalence among pregnant women was 2.0% in 2012. (EPHI 2014)
- MMR= 420/100,000 live births. (WHO, 2013)
- One of the 5 countries account for 50% of the world's maternal deaths. (Hogan et al, 2011)



Background and Research Problem...

HIV prevalence:

- ▶ **Urban** - 4.5% (5.2%)
 - ▶ **Rural** - 1.7% (0.8%)
- (EPHI 2014, EDHS 2011)

HIV Infection:

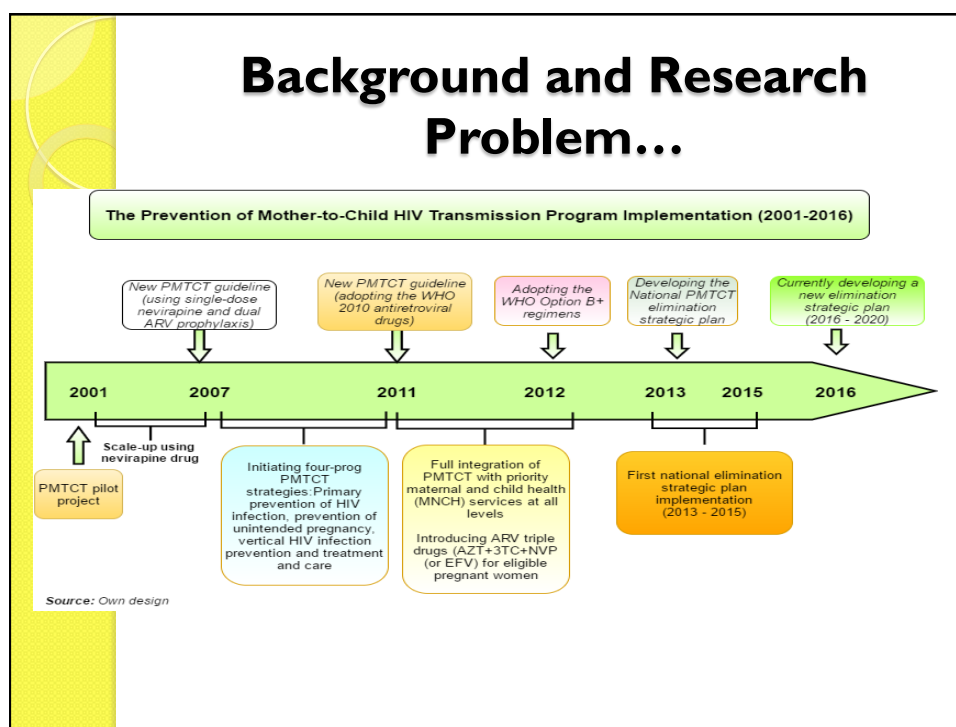
- ✓ 154,084 children under 14 years are living with HIV
 - ✓ 5,492 New HIV Infections in 2013
 - ✓ More than 90% of these infection is through mother-to-child transmission.
- (EPHI, 2014)

PMTCT:

- ✓ **However, PMTCT coverage is low**
 - ❑ Of 38,405 targets, only 9,775 women received treatment in 2012 (FMOH, 2012)
 - ❑ Less than 50% coverage (UNAIDS, 2013)



Background and Research Problem...



Background and Research Problem...

What is the challenge ? Prevention of mother to Child HIV transmission (PMTCT) program in Ethiopia

- ❑ 79 percent fund cut in 2013 from 2012 funding level. (EATG, 2012)
- ❑ Changing PMTCT strategies over time (2001....Single dose Nevirapine regimen; 2007....Single dose Nevirapine & dual ARV prophylaxis and 2012....Elimination Strategy Plan.
- ❑ Heterogeneous HIV prevalence (urban and rural) among pregnant women. (Berhane et al, 2008)
- ❑ Limited societal cost and resource allocation evidence for policy decision makers (Asfaw et al, 2012, Bikilla et al, 2009, Johns et al, 2014)
 - In low income countries, like Ethiopia, there was no satisfactory costing data from health care system, patient and societal perspectives.
- ❑ Poor perception and practice of the application of economic evaluation in the PMTCT program cycle (Zegeye et al, 2016 in press)

Study Objectives...

This study assesses the societal cost of mother-to-child transmission of HIV/AIDS across HIV prevalence heterogeneity (high, low) urban-rural contexts by estimating:

- *the cost of PMTCT program from the health care provider perspective.*
- *the cost-of-illness attributed to patients with HIV on the PMTCT program from the patient perspective.*

Materials and Methods

- **Health service provider** ingredient costing was collected from twelve health facilities in Ethiopia.
 - Six health facilities with the highest HIV prevalence among pregnant women (8.1% to 17.3%) were chosen in urban setting, and six health facilities with the lowest prevalence rate (0.0% to 0.1%) were surveyed from the rural setting.
 - Simultaneously, patient cost data were collected from 85 HIV positive pregnant women attending the surveyed health facilities, 17 Mother Support Groups (MSGs) and 12 health care professionals.

Materials and Methods...

Surveyed health facilities

Surveyed health facilities	Region	HIV prevalence	Location from the center	Settings
Felege Hiwot Hospital	Amhara	17.3	Northern Ethiopia	Urban
Hiwot Fana Hospital,	Harari	8.8	Eastern Ethiopia	Urban
Dile Chora Hospital	Dire Dawa	8.1	Eastern Ethiopia	Urban
AFRTH Hospital	Addis Ababa	8.7	Addis Ababa	Urban
Soddo Health Center	SNNPR	8.8	Southern Ethiopia	Urban
Teklehaimanot Health Center	Addis Ababa	8.8	Addis Ababa	Urban
Limuseka Health Center	Oromia	0.0	Western Ethiopia	Rural
Daddim Health Center	Oromia	0.0	Western Ethiopia	Rural
Toke Health Center	Oromia	0.0	Western Ethiopia	Rural
Chewaka Health Center	Oromia	0.0	Western Ethiopia	Rural
Kokosa Health Center	Oromia	0.0	Eastern Ethiopia	Rural
Hasange Health Center	Harari	0.0	Eastern Ethiopia	Rural

Source: Antenatal care (ANC) sentinel HIV/AIDS PMTCT surveillance report (EPHI, 2014)

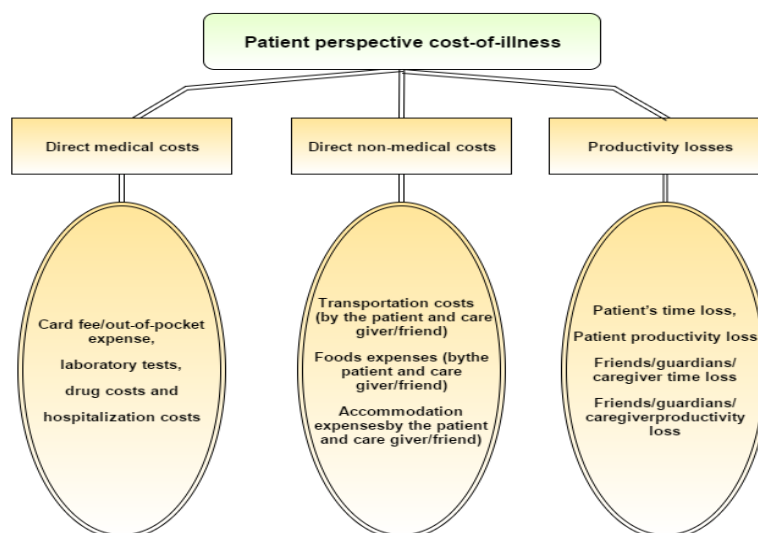
Materials and Methods...

Societal cost analysis:

- The costing analysis was a micro-costing (ingredient based approach) to identify, measure and value the resource used to provide PMTCT service. (Drummond et al 2005)
- Patient cost-of-illness analysis was conducted through a retrospective bottom-up approach. (Tarricone 2006) and consisted of transportation cost, out-of-pocket expense, productivity loss (*applying Human Capital Approach/HCAI*).
- The inputs was valued with 2014 USD dollar, at 3% discount rate and adjusted inflation.

Societal cost = healthcare provider + direct medical + direct non-medical + productivity cost

Materials and Methods...



Findings

A. Healthcare provider cost

Urban health facilities	Unit cost PPY (ETB)	Unit cost PPY (USD)	Rural health facilities	Unit cost PPY (ETB)	Unit cost PPY (USD)
Teklehaimanot Health Center	6,280.39	319.28	Limuseka Health Center	5,729.87	291.29
Soddoo Health Center	8,406.88	427.38	Chewaka Health Center	4,322.62	219.75
Hiwot Fana Hospital	20,778.64	1,056.34	Daddim Health Center	7,538.46	383.24
Dile Chora Hospital	14,410.24	732.58	Hasange health center	6,318.98	321.24
Felege Hiwot Hospital	11,194.85	569.12	Kokossa health center	6,103.47	310.29
AFRTH Hospital	21,620.19	1,099.12	Toke health center	5,598.17	284.60
Mean	13,781.87	700.64	Mean	5,935.26	301.73
Stdev (SD)	6,366.23	323.64	Stdev (SD)	1,049.02	53.33

Findings...

Figure 1: Costing resource distribution of PMTCT service in urban high-HIV prevalence health facilities setting – direct medical costs

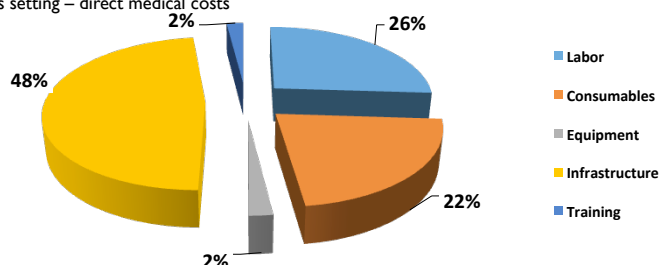
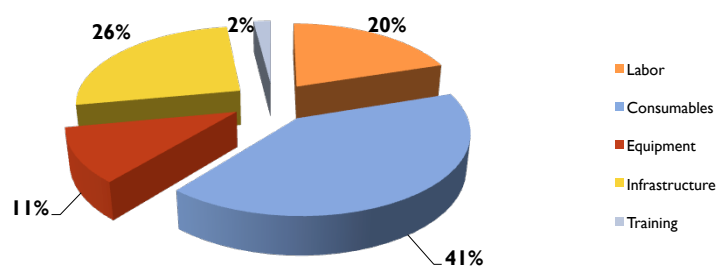
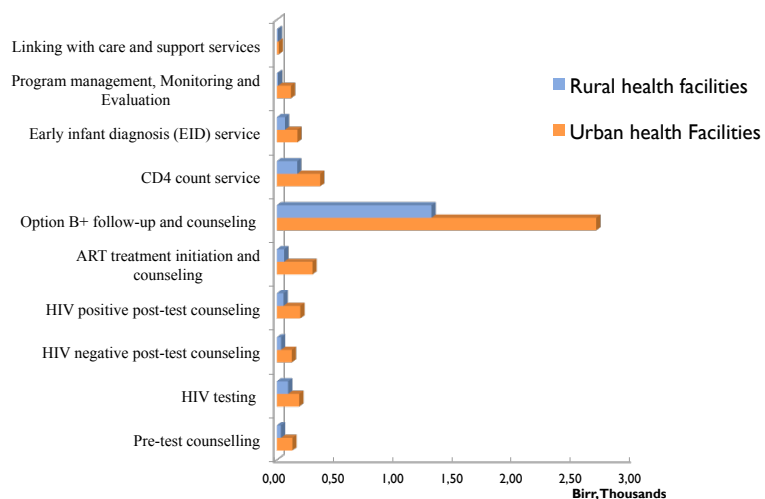


Figure 2: Costing resource distribution of the PMTCT service in rural low-HIV prevalence health facilities setting – direct medical costs



Findings...

Costing the PMTCT service packages – health service costs



Findings...

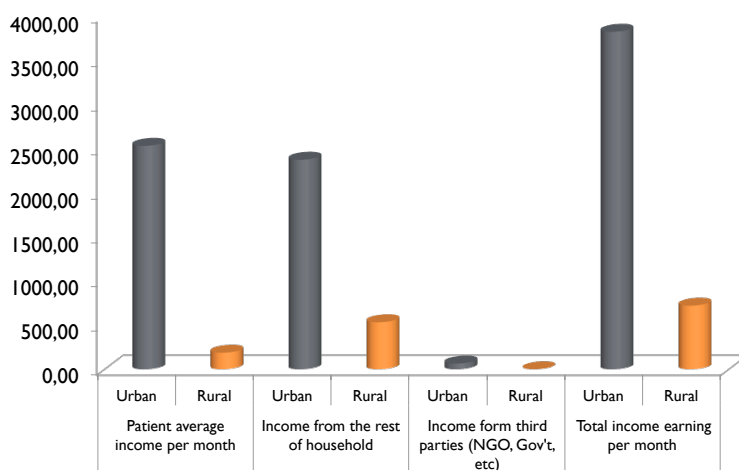
Patient perspective cost-of-illness analysis

Table Direct medical, direct non-medical and productivity loss per patient per year

Cost per patient per year	Urban	Rural
	Mean (SD)	Mean (SD)
Direct medical cost	746.00 (749.68)	368.4 (161.91)
Direct non-medical costs		
Transport cost (by the patient)	1,276.07(3099.38)	636.67 (349.31)
Transport cost (by Friends/ relatives/ guardians)	1,783.73(1470.39)	2,066.44 (2193.88)
Food costs (by the patient)	4,700.5 (4226.35)	1,510.83 (376.18)
Food costs (by Friends/ relatives/ guardians)	811.29 (403.72)	832.78 (783.64)
Accommodation expense (by the patient)	458.54 (1157.1)	6.9 (37.14)
Accommodation expense (by Friends/ relatives/ guardians)	0.0 (0.0)	19.67 (44.5)
Productivity losses	7,432.69	624.6
Total cost per patient per year	17,208.82 (USD 874.85)	6,066.3 (USD 308.4)

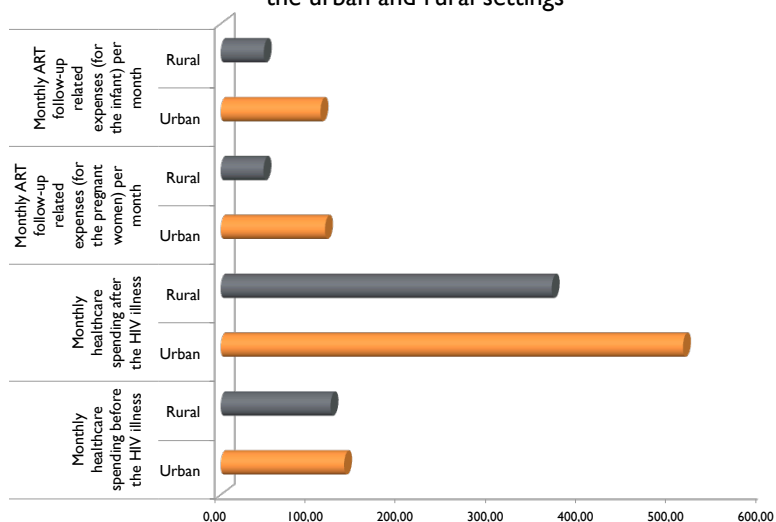
Findings...

Patients: Household income and health care spending



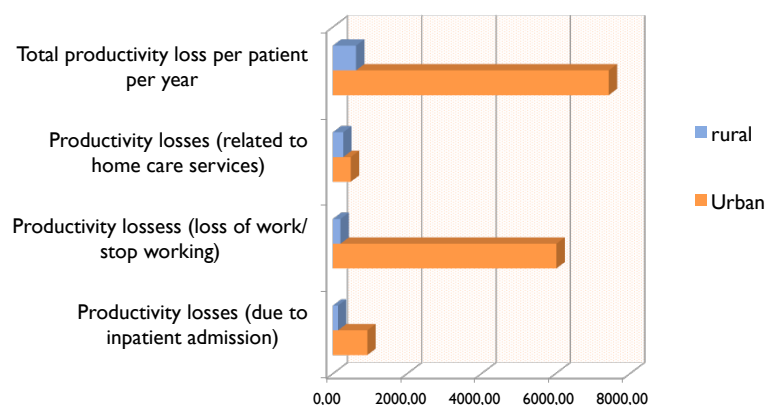
Findings...

Patient: monthly health care spending before and after the HIV illness and the monthly health care spending associated with ART follow-up, in the urban and rural settings



Findings...

Patient: Productivity lost per patient per year due to the HIV/AIDS illness



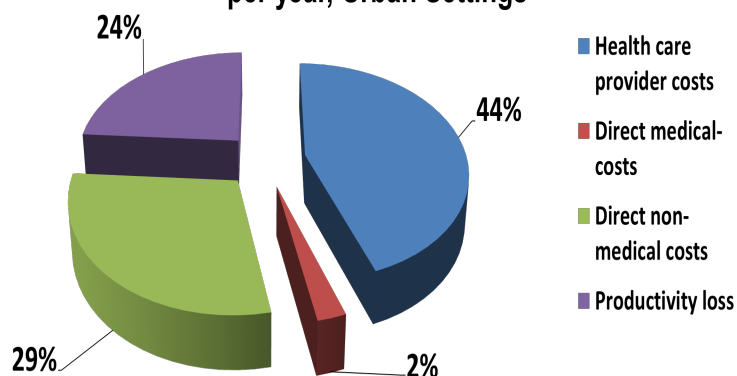
Findings...

Societal cost:

- A pregnant women-infant pair per year incurred a societal cost of **ETB 30,990.69 (USD 1,575.49) and ETB 12,001.55 (USD 610.13)** in urban high-HIV prevalence and rural low-HIV prevalence settings, respectively.
- The overall societal cost (per PPY) in urban high-HIV prevalence settings **costs more than twice** the cost in rural low-HIV prevalence settings.
- Of the societal cost ingredients, health care system/provider costs accounted for the highest proportion of the cost, which **comprises of 44% and 49% in urban and rural settings**, respectively

Findings...

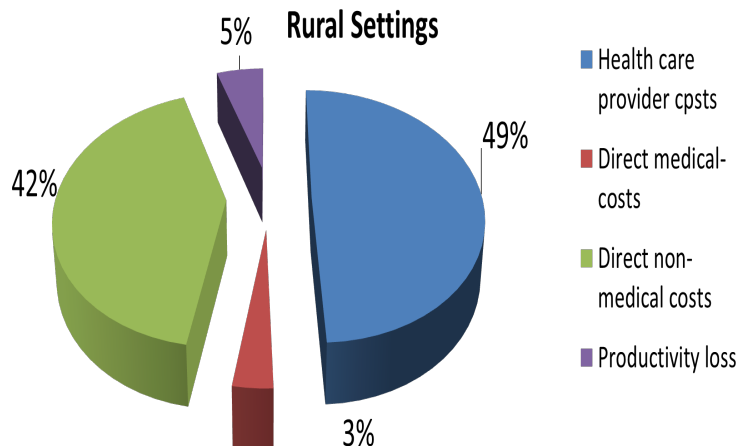
Societal unit cost per pregnant woman-infant pair per year, Urban Settings



Findings...

Societal unit cost per pregnant woman-infant pair per year,

Rural Settings



Conclusion

- ❑ The societal cost varied across HIV prevalence heterogeneity and urban-rural settings.
- ❑ The society in urban high HIV prevalence would incur a high cost as compared to low HIV prevalence rural population.
 - Patients are still incurring a substantial direct medical, direct non-medical and productivity loss, which affects the intended public health utilization for the HIV positive pregnant women and pediatrics attending lifelong antiretroviral treatment, and these hinder the path towards UHC.
 - The productivity losses and non-medical costs (transportation and food costs) accounts for a substantial proportion of costs, in both the urban and rural settings.

Conclusion

- In an effort to eliminate new HIV infection, it is vital to analyze the wider societal perspective costing so as to inform health care priority decisions, as well as to conduct a robust cost effectiveness analysis.
 - To improve the low PMTCT service coverage, local context costing evidence is required for continuous PMTCT program management.
 - Costing informs the budget preparation, program planning, intervention scale-up and highlight possible cost containment strategies
 - UHC aims for unhindered health care service access; HIV-positive pregnant women (including relatives/friends/families) incurred substantial direct medical, direct non-medical and productivity loss.

THANK YOU SO MUCH



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