The Socio-Demographic Characteristics and Economic Impact of HIV/AIDS in Egypt

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Abstract: Egypt still faces several challenges in maintaining low prevalence of HIV. Some take the view that HIV/AIDS has had little impact on the macro-economy so far. However, projections estimate that prevalence rates in Egypt in the year 2015 (3.8 - 16.1%) would cause GDP losses that approximate 44 percent of today's GDP. This cross sectional study used both qualitative and quantitative methods to identify socio-demographic characteristics & economic impact of HIV/AIDS. In-depth interviews were conducted with cases (25% of the AIDS population in Egypt), their families and National AIDS Program managers and policy makers. Desk review was carried out for gathering data from available documents. Current output loss due to AIDS deaths and treatment cost were estimated from the perspective of the patient. Results revealed that about 69% were males, 15% were illiterate and 51% were urban residents. Of female respondents 12.4% were widowed. Only 50% of all study participants were working. About LE50-60 Million is spent every year to cover preventive and curative services adopted by the MOHP/NACP. Of all AIDS cases 400 cases need treatment. The average medication cost is about LE3000 per case per month. Paying for the medication other than ARV was out of pocket in 100% of Upper Egypt, rural and female respondents. Average monthly cost of medications was LE 681.7±2112.7. Regarding macroeconomic impact potential output losses in 2006 was %0.000031. It is concluded that delaying action towards HIV will have unpredictable costs. Reducing risks in those population groups most likely to contract and spread HIV can be highly cost-effective**.**
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1. Introduction:

HIV's prevalence in Egypt is considered to be low, with estimates around 0.02 percent of the general population. This is approximately 9,213 people. But preconditions for a wider spread exist [1, 2]. The risk of being infected can be associated with both individual's knowledge and behavior and community vulnerability influenced by cultural norms, laws, politics, and social practices [1]. Egypt receives millions of tourists and refugees from countries with high HIV prevalence and/or illicit drug use rates [2,3]. In addition, there are pervasive fears and stigmatization of HIV/AIDS, a lack of effective STI/HIV/AIDS education programs and other preventive measures, such as peer education, outreach and behavior change communications among at-risk groups [2]. An increase in the incidence of HIV-TB co-infection could add to the complexity of fighting both diseases in Egypt. Additional high risk factors include overpopulation, especially in the age bracket of 15–24 who constitute 50 percent of HIV patients [2], labor migration, unemployment of youth [3], poverty, illiteracy in the general population particularly among women, weak health system despite huge infrastructures and a very high level of Hepatitis C infection, a virus with similar modes of transmission of HIV. Most reported HIV cases are transmitted through unprotected heterosexual sex, and 90% of Egyptian women who live with HIV were infected within marriage [4]. Being an STD, HIV increases morbidity and mortality of young generations with a damaging impact on families and communities: skills are lost, workforces shrink and children are orphaned [2, 5].

The impact of the HIV/AIDS epidemic on the economy has been a concern since the beginning of the pandemic. Studies showed that GNP growth could decrease by more than 1 percentage point for every 10 per cent HIV prevalence. According to a World Bank study of nine Arab countries, the current poor level of response to the epidemic will result in a fall in gross domestic product (GDP) of 30–40% over the coming years, leaving those countries under the poverty line. Others take the view that HIV/AIDS has had little impact on the macro-economy so far. It is difficult to estimate empirically the effect of HIV/AIDS on economic performance since so many factors other than HIV/AIDS affect economic growth [6]. Authors identified four channels through which HIV/AIDS may affect the economy: the production channel where HIV/AIDS affects the main factors of production—labor and capital; the allocation channel as HIV/AIDS reroutes resources to medical expenses and away from other productive uses; the distribution

channel when HIV/AIDS increases health expenditures and weakens the income base, the lowest income groups may fare the worst; and the regeneration channel because HIV/AIDS undercuts the investments and the process of economic development, as it compromises the saving capacity and the human capital of the economy [7-8].

This research was conducted to study the socio-demographic profile of patients living with HIV/AIDS (PLHA) and identify the potential impact of HIV/AIDS at both macro and microeconomics level.

2. Methodology

Study Design:

This was a cross sectional study having descriptive and analytical elements and using both qualitative and quantitative methods.

Study Setting:

This study included PLHA from two urban governorates (Cairo and Alexandria), Lower and Upper Egypt governorates and NAP central managers in Cairo.

Sampling technique:

A little over 1000 individuals were living with HIV being regularly followed by the MOH/NAP with available contact information. In 2009 a sample of 25% of this population (250 PLHIV/AIDS) was selected in collaboration with the NAP. Sample selection was done according to geographic distribution of cases, to represent rural/urban Upper and Lower Egypt and largest urban governorates, i.e. Cairo and Alexandria. Participants included PLHA, their families, NAP managers, personnel and policy makers.

Study Tools:

Close- and open-ended questions using quantitative and qualitative techniques

1- In-depth interviews to NAP managers and personnel
2- In-depth interviews to PLHA and their families

Questions covered economic, cultural, planning and services, policies and health expenditure.

Data Collection:

Consent for participation was obtained. A desk review was done to obtain data needed to estimate economic impact to study other findings related to the social and economic profile of AIDS.

Methods of Estimating the Economic Impact of HIV/AIDS

1. The Macroeconomic Impact

a) Reviewing of literature to identify the mechanisms by which HIV/AIDS can affect the economy of a country and the estimations done by other authors in other countries.

b) Estimation of the cost from the perspective of the MOHP/NACP. The last year for which available data and documents were attained was 2008/2009.
   - Total annual budget of NAP.
   - Items of expenditure of NAP budget.
   - Cost of case management.
   - Share of donors and private sector in covering AIDS expenses.

c) Output loss for Year 2006 due to AIDS deaths: through using the labor force percent out of total population the annual productivity of labor was calculated in LE. This was multiplied by the number of deaths in 2006. The product is further divided on 2006 GDP to estimate the potential output losses in the year 2006.

d) Output loss for Year 2006 due to medication cost.

2. The Microeconomic Impact

- Pattern of income and expenditure before and after respondents' and spouses' infection.
- Perceived types of changes in family situation after respondents' and spouses' infection.
- Source of financing of the medication other than ARV
- The cost of medical treatment from the perspective of the patient:
  - *Direct cost*: is paid by the patient directly to the health care providers. The monthly cost of medications, special diet and lab investigations are added to calculate the direct cost.
  - *Indirect cost*: the transportation costs and loss of previously earned income.

3. Results

A socio-demographic portrait

Male respondents greatly outnumbered women (172 men with a 69%, and 78 women with a 31%). Women infected with HIV/AIDS were generally younger than men. They exceeded the men proportionately in the three categories below 30 years, however, males exceeded females in the age group, 23.8% and 6.4%, respectively**.**

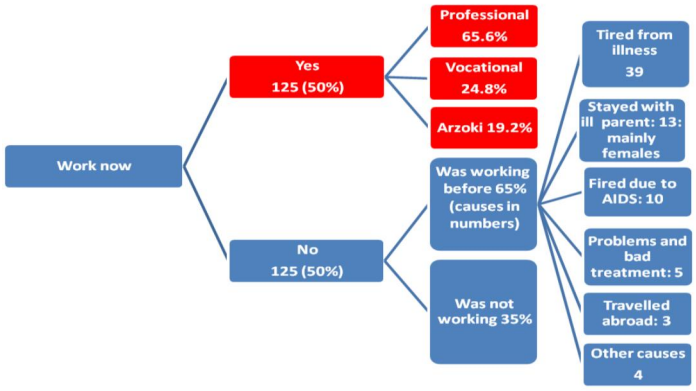
Men are better educated than women with a small difference, for example 19.2% of women and 24.4% of men have university education**.** Illiterate males and females are 12.8% and 20.5%, respectively.

Among respondents 82% were living in Lower Egypt (northern with large cities). Whereas only 6.4% of the women had never been married, this was the case for 32.6% of the men. Alternatively 39.6% of the women were widowed but only 1.2% of the men**.** "I divorced my wife because one day she told me you must thank God that I am still living with you while you are in this state".

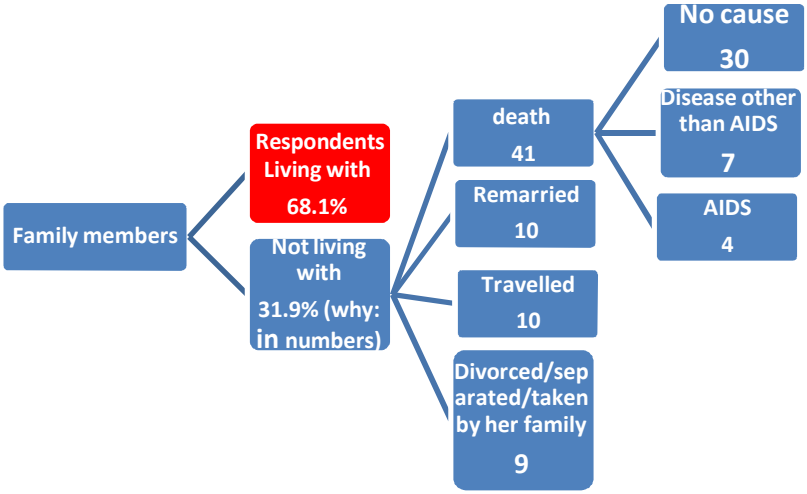
Only 50% of all study participants are working now. Out of the working half 65.6% are at a professional job. Most of the currently non-working

left their work because of being tired from illness or to stay home to care for an ill parent. These were mainly females (**Flowchart 1**). "I was fired from work because they knew I had AIDS", "I was a farmer on my own land but now I am too ill to work", "I was successful in my career, I was a Hotel Manager, but now I've lost everything", said three of the respondents.

Flowchart 1: Current working status of respondents



About two-thirds of the family members of the respondents are currently living with them (**Flowchart 2**). However, even those continuing living among their family members suffer some sort of pressure. "My mother is the only person who supports me and gives me hope in life, while my brothers and sisters avoid me and they make me feel that I have done something wrong", said a single young man affected with AIDS. "My wife fears that our children will be infected, and she refuses to drink from my cup", said another patient.



Flowchart 2: Household existence of respondents' family members

The macroeconomic impact

a. Financing of MOHP/NACP

According to the National AIDS Program (NAP) officials about LE50-60 Million are spent every year to cover preventive and curative services adopted by the MOHP/NAP.

Of all AIDS cases 400 receive treatment that is covered by the MOH. The average medication cost is about LE3000 per case per month. The USD has been equivalent to 5.5-6 Egyptian pounds for the last five years. This is apart from the medical costs of managing complications that include opportunistic infections, and apart from inpatient services expenses. Both costs are not estimated by the NAP.

Annual analysis of about 1,200,000 blood samples which is done to screen HIV-infected cases costs about LE70-80 Million. The CD4 count applies to all AIDS cases every 3 months. It costs LE250 per person. The NAP budget also covers the annual training of physicians in different specializations to properly manage an AIDS patient.

Real financial support from the private sector in Egypt is missing. According to the Global Fund Grants a fund of $11527830 is projected to cover anti-AIDS planned activities along two phases. Less than half the latter fund have been agreed.

b. Output loss due to AIDS

Output loss due to AIDS deaths is calculated for Fiscal Year 2006/2007. Through using the labor force percent out of total population [8] the annual productivity of labor was calculated in LE (**Table** 1). This was multiplied by the number of deaths in 2006. The product is further divided on 2006 GDP to estimate the potential output losses in the year 2006 (**Table** 2).

Table 1: Computing average productivity in Egypt from 2002-2006

Year	Population (mn)	Labor force/population%	GDP (LE bn)	*Annual productivity of labor (LE)
2001-2002	67.9	29.5%	379.0	19856.9
2002-2003	69.2	29.4%	417.5	20521.2
2003-2004	70.5	30.6%	407.0	18866.2
2004-2005	71.9	30.8%	425.2	19200.6
2005-2006	73.6	31.8%	454.3	19410.6
2006-2007	77.5	32.5%	744.3	29550.4
2007-2008	81.7	NA	798.1	NA
Average productivity (2002-2006)			LE 21234.3	

*Average GDP produced by each individual of the labor force of that year.

Table 2: Potential output losses in FY2006 in LE due to AIDS losses

Average productivity	AIDS deaths in 2006		Potential output losses in 2006		
	*High estimate	**Low estimate	*High estimate	**Low estimate	Average
LE 21234.3	1144	1028	24292039.2	21828860.4	
			(0.000033% of GDP)	(0.000029 % of GDP)	(%0.000031 of GDP)

* Assuming the high estimate deaths of the HIV (2006): 1144,
** Assuming the low estimate deaths of the HIV (2006): 1028.

c. Medication Cost

Due to incomplete information we needed to resort to a better proxy of the medication cost i.e. the medication cost in other developing and comparable countries. Thus, for analytical purpose the average medication cost of the Caribbean countries and Ethiopia, which was as low as 257 USD (2185 Birr) and as high as 4000 USD respectively, was taken [7, 10] (**Tables 3 and** 4).

Table 3: Medication Cost in Egypt Using the Ethiopian Estimation of Medication Cost (in USD)

Infected Adult Medication Cost (USD)					Medication cost related to HIV death (USD)			
Average cost per adult		Infected Adult	Medication Cost	Output loss		HIV Death	Medication Cost	Output loss
257 USD	*Scenario 1	2744	705208	(0.00089 % GDP)	*Scenario 3	1028	264169	(0.00033% GDP)
	*Scenario 2	10757	2764549	(0.0034% GDP)	*Scenario 4	1144	294008	(0.00037% % GDP)

* Scenario 1, assuming the NACP prevalence of the HIV, 2009, according to interviewed NACP personnel: 2744, * Scenario 2, assuming the WHO prevalence of the HIV, 2009, according to interviewed NACP personnel: 9213-12300 (av10757), * Scenario 3, assuming the low estimate deaths of the HIV, 2006, according to interviewed NACP personnel: 1028, * Scenario 4, assuming the high estimate deaths of the HIV, 2006, according to interviewed NACP personnel: 1144.

Table 4: Medication Cost in Egypt using the Caribbean Estimation of Medication Cost (in USD)

Infected Adult Medication Cost					Medication cost related to HIV death			
Average cost per adult		Infected Adult	Medication Cost	Output loss		HIV Death	Medication Cost	Output loss
4000 USD	*Scenario 1	2744	10976000	(0.013% GDP)	*Scenario 3	1028	4112000	(0.0052% GDP)
	*Scenario 2	10757	43028000	(0.054% GDP)	*Scenario 4	1144	4576000	(0.0057% % GDP)

* Scenario 1, assuming the NACP prevalence of the HIV, 2009, according to interviewed NACP personnel: 2744, * Scenario 2, assuming the WHO prevalence of the HIV, 2009, according to interviewed NACP personnel: 9213-12300 (av10757), * Scenario 3, assuming the low estimate deaths of the HIV, 2006, according to interviewed NACP personnel: 1028, * Scenario 4, assuming the high estimate deaths of the HIV, 2006, according to interviewed NACP personnel: 1144.

According to interviewed NAP officials a more intimate estimation would be done by using the NACP figure, namely, LE3000 per case per month (LE36000/year) (**Table** 5).

Table 5: Medication Cost in Egypt using NACP Estimation of Medication Cost (in LE)

Infected Adult Medication Cost					Medication cost related to HIV death			
Average cost per adult		Infected Adult	Medication Cost	Output loss		HIV Death	Medication Cost	Output loss
LE36000/ year	*Scenario 1	2744	98784000	(0.0216% GDP)	*Scenario 3	1028	37008000	(0.00816% GDP)
	*Scenario 2	10757	387252000	(0.0852% GDP)	*Scenario 4	1144	41184000	(0.00912% GDP)

* Scenario 1, assuming the NACP prevalence of the HIV, 2009, according to interviewed NACP personnel: 2744, * Scenario 2, assuming the WHO prevalence of the HIV, 2009, according to interviewed NACP personnel: 9213-12300 (av10757), * Scenario 3, assuming the low estimate deaths of the HIV, 2006, according to interviewed NACP personnel: 1028, * Scenario 4, assuming the high estimate deaths of the HIV, 2006, according to interviewed NACP personnel: 1144.

Perceiving a change of family situation after spouse's infection was more evident among male than female respondents, 62.5% and 53.3%, respectively. However, social changes were more perceived by male respondents than financial ones, 60% and 20%, respectively. On the other hand, financial changes were more perceived among Upper Egypt respondents than social ones, 57.1% and 21.4%, respectively.

Paying for the *medication* other than ARV was out of pocket in 100% of Upper Egypt, rural and female respondents. Average monthly cost of medications was LE 681.7±2112.7. The source of drugs is the pharmacy, the Liver Institute or Caritas NGO in 90.9%, 7.8% and 1.3%, respectively. "*I receive charity from the Mosque and a private doctor", "I receive financial support from an NGO*", said two respondents.

About a third of respondents (31%) needed special food with an average monthly cost of LE 503.7±439.5. Some respondents (11.2%) needed to perform lab investigations with an average monthly cost of LE227.68±252.7. These are done mainly in governmental hospitals (83.6% of users) followed by private hospitals (7.1% of users). The monthly direct costs of case treatment, as reported by respondents, ranged from 240-11799, with a median and inter-quartile range of 721 (383-1242.5) and a mean and SD of 2408.2±4125.8. These values were calculated by mere addition of the expenses reported by the respondents; medications, laboratory investigations and special diet.

4. Discussion

Despite a low prevalence of HIV/AIDS, Egypt still faces several challenges in maintaining this low prevalence. These challenges include tourism, deficient education programs, increased HIV-TB co-infection, overpopulation, poverty, illiteracy and high level of Hepatitis C infection. Being an STD, HIV increases morbidity and mortality of young generations with a damaging impact on families and communities [2]. In spite of believing that the conservative culture in the MENA countries has helped in speeding down the HIV spread, besides the universal practice of male circumcision that was found to decrease HIV infection by 60%, this does not mean that these countries are immune to HIV spread [13]. Among SMS in MENA countries alarming indicators of risk behavior included (4–14 partners on average in the last six months among different MSM populations) and of biomarkers of risks (such as herpes simplex virus type 2 at 3%–54%), the overall low rate of consistent condom use (generally below 25%), the relative frequency of male sex work (20%–76%), and the substantial overlap with heterosexual risk behavior and injecting drug use suggest potential for further spread [4].

According to NAP managers current sentinel sero-surveillance, although indicative of increased prevalence, is not yet representative of the true state of the epidemic. Factors explaining this gap include the social marginalization of at-risk groups mainly MSM, severe lack of knowledge among health workers and the general population, the conservative nature of Egyptian and their reluctance to discuss sexuality and health system understaffing, bureaucracy, limited budget and fragmentation of efforts. The passive HIV/AIDS reporting remains the cornerstone in the HIV surveillance systems [1].

Socio-demographic impact of an HIV/AIDS

Two thirds of interviews cases were males. One of the explanations for this is that usually fewer women are tested for HIV. Men are freer for testing without everyone else knows about it. In Egypt men are also obliged to be tested before traveling abroad for work. In addition, approximately one third of the men had not yet married, whereas the women had almost all been infected within marriage. In other words, a larger population of men is exposed to infection and its diagnosis than women.

Female respondents are generally younger than male ones. The largest proportion of women respondents is 25-29 (24.4%) whereas the largest age

group among men was 40-44 (23.8%). One possible explanation is that women marry at a younger age than men and since they are infected by their husbands on the whole [11], they are likely to be younger.

On the other hand, the proportion of women in the highest two age groups is slightly more than the men. One may speculate that wives may receive treatment earlier than their husbands because the family has perhaps learned from the husband's experience and they (the women) thus survive longer.

Egyptians living in Lower Egypt (the northern, relatively more developed part of Egypt containing all the largest cities) are 42.8% and those living in Upper Egypt are 55.4% [13]. In our sample, however, the distribution was heavily weighted towards Lower Egypt (82%).

As we have mentioned, most women in Egypt become infected with HIV/AIDS through heterosexual contact within marriage. This tragedy is clearly shown by the marital status of the women in our sample, only 43.6% of whom are living with their husbands, practically all of whom have HIV/AIDS; almost 40% have already lost their husbands, mostly from AIDS and an additional 14% are divorced or separated, mostly due to sickness either of themselves or their husbands. It is a desperate picture and completely at odds with the situation of the general population, where only 11.9% were widowed in 2006 [4,14].

Economic impact of an HIV/AIDS

The potential output losses in FY2006 in LE due to AIDS losses were found to be as small as %0.000031 of GDP. Although the macroeconomic impact of HIV/AIDS seemed to be minute delaying prevention and control actions can cause unexpected costs. The World Bank conducted the first attempt to evaluate the risks of an HIV/AIDS epidemic in 9 Middle East and North Africa (MENA) countries (Algeria, Djibouti, Egypt, Iran, Jordan, Lebanon, Morocco, Tunisia, and Yemen) and its potential economic cost [6]. Other authors found no evidence for a sustainable HIV epidemic in the general population in any of the MENA countries, except possibly in southern Sudan [12].

According to the WB MENA study, the prevalence rates in Egypt in the year 2015 would be 3.8 percent. On average, GDP losses due to the projected prevalence for 2000- 2025 could approximate 44 percent of today's GDP. There, health expenditure on AIDS would represent 1.3 percent of GDP [6].

The range of variation of the economic figures between Egypt and the other eight countries under study is similar (excluding Djibouti). The prevalence of HIV/AIDS in MENA countries in year 2015 would be between 0.3% and 17% (excluding Djibouti). However, others take the view that HIV/AIDS has had little impact on the macro-economy so far. It is difficult to estimate empirically the effect of HIV/AIDS on economic performance since so many factors other than HIV/AIDS affect economic growth. However, one cannot imagine the realism of the picture projected by the World Bank [6] within the economic evidence of our study.

At the microeconomic level, many responses describe the family's finances deteriorating situation after respondents' infection; Level of expenditure reported by respondents after their spouses' infection has dramatically decreased. That is most likely due to the indicated reduction of both partners' work and income. This could be explained by a decrease in physical ability and /or diverted time to care for one's ill spouse. In addition the money earned from other new sources of income, including NGOs, is mainly spent on treatment.

For three reasons these figures should be considered cautiously. First, this cost is identified from the patient's perspective, and not the MOHP, the community or the health facility. Second, the statements of the patients might be underestimating as a trial to get more financial and medical support from the agencies conducting the interview. Third, some of the cost items were not recorded, e.g. the physician fee, the hospital admission costs and the transportation costs. Also, indirect costs related to loss of previously earned income were not thoroughly investigated.

In rural Malawi AIDS-affected households may compensate for production losses by reallocating tasks among household members. Economic effects affect women's time, whereas men's time is unresponsive to the same shocks. Most notably, AIDS is shown to induce diversification of income sources, with women (but not men) reallocating their time, generally from work-intensive to cash-generating tasks [9].

Out of annual income per capita 56% decrease in affected Nigerian households. Approximately 40% of these costs were income losses associated with sickness and care-giving. 10% of the cost of HIV is accounted for by public subsidies for health. The largest single cost, representing 54% of the total economic burden of HIV, is for out-of-pocket expenses for healthcare [5].

Reducing risks (through information and preventive behaviors and services) in those population groups most likely to contract and spread HIV can be highly cost-effective [15]. Interventions such as reproductive health and HIV/AIDS education in schools [16], targeted STD treatment for highly vulnerable groups, and harm reduction for IDUs have

also proved to be cost-effective. Expanding condom use and access to clean needles for intravenous drug users GDP losses during the period 2000-2025 would be significantly reduced [6,12].

Effective outreach must be linked with facilitating their access to HIV testing, treatment and care, and revising stigma and taboos, also the need for expanding the dialogue with political and religious leaders and building the capacity of civil society organizations for more effective outreach to such groups [12].

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