

The Nourishing Nutritional Answer to HIV/AIDS

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Abstract: This paper puts forward that HIV/AIDS is multi-factorial and therefore the interventions to combat it should also be multi-pronged. However, any problem requires simplification, and given this, an important intervention to prevent/mitigate HIV/AIDS is nutritional intervention. Nutritional intervention alone does not suffice to control HIV/AIDS, but it could go a long way to alleviate the disease's spread and severity.

Key words: HIV/AIDS, nutrition, HIV prevalence rate

Introduction

AIDS, the plague of the twenty first century, continues to claim human lives. While a fool-proof medicinal cure for this bane is still waited upon anxiously, the ways to mitigate its effects and slower the disease progression in the affected population is an onerous and confounding task. As Loevinsohn and Gillespie (2003) report, tuberculosis prevalence fell drastically in the late 19th and early 20th centuries, before treatment was available because of improved living conditions and nutrition. Thus, the challenge lies not only in finding the cure for the disease but also undertaking strategies to mitigate the problem.

The paper proposes that nutrition has a key role to play in the HIV/AIDS prevention and mitigation. It begins with the understanding the AIDS problem and a synopsis of the worldwide existing AIDS scenario. Section II deals with the HIV/AIDS disease aetiology. This is followed by impacts of HIV/AIDS in the third section. The relationship between nutrition and AIDS is looked into in the fourth section. Each of these sections are backed with figures and diagrams computed and/or reported from secondary data sources, with meaningful comparisons, where possible. The fifth section takes a look into some representative HIV/AIDS correlation data. The final section is conclusions with certain policy implications and research directions.

Section I: The existing AIDS problem: It is widely accepted that the continent worst hit by AIDS is Africa, within which Sub Saharan Africa is at the greatest risk. Dixon *et al.*, 2001 reported that Sub Saharan Africa, with majority nations in the bottom third of UNDP's Human Development Index are the countries least able to manage the disease. The next hot spot might turn to Asia, specially South and South East Asia with high populations and lower incomes, which acerbate the problem. The competing national priorities hinder resource allocation towards HIV/AIDS prevention, mitigation, care and treatment (UNAIDS/WHO, 2002).

Global trends in HIV/AIDS

Asia and the Pacific: UNAIDS/WHO, 2002 report that

Table 1: Global Summary of the HIV/AIDS Epidemic

Number of people living with HIV/AIDS (in millions)	
Total	42
Adults	38.6
Women	19.2
Children (under 15 years)	3.2
People newly infected with HIV in 2002 (in millions)	
Total	5
Adults	4.2
Women	2
Children (under 15 years)	0.8
AIDS deaths in 2002 (in millions)	
Total	3.1
Adults	2.5
Women	1.2
Children (under 15 years)	0.61

Source: AIDS epidemic update, Dec. 2002, UNAIDS/WHO

barring Cambodia, Myanmar and Thailand, HIV prevalence rate in Asia and the Pacific is low. That significance is lost in highly populated countries like China, India and Indonesia, where in spite of the low rate, rather large absolute numbers of people are suffering, specially in forms of local epidemics, pandemic to certain regions in the countries. For example after South Africa. India has the second highest absolute numbers of people living with HIV, it being 3.97 million at end of 2001. In China the disease is not showing any signs of slowing down. If it continues at the present rate, a total of 10 million Chinese will have acquired HIV by end of this decade, which is equal to the total population of Belgium.

Eastern Europe and Central Asia: This region has a lower prevalence of HIV/AIDS but unfortunately it has world's most fastest growing HIV/AIDS epidemic. The Russian Federation has shown a very steep rise. Often in this region the spread of the AIDS epidemic is predominately linked to increased drug injections, while in Belarus and Ukraine heterosexual intercourse is the prominent mode of transmission.

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Sub Saharan Africa: The worst HIV/AIDS hit region of the world offers some hope with a decline in HIV prevalence in South Africa in pregnant women under 20 and among young inner-city women in Addis Ababa in Ethiopia. However, the worst of HIV/AIDS is not yet over and in Botswana, Lesotho, Swaziland and Zimbabwe the HIV prevalence has risen, crossing 30% mark. A very small percent of people are receiving antiretroviral treatment; millions do not receive it.

Latin America and the Caribbean: The epidemic is well established in this region and the Sentinel surveillance data leads to believe that among pregnant women HIV prevalence has stabilized, even perhaps begun to decline. In several Caribbean countries adult HIV rates are second only to Sub Saharan Africa, making this the second most affected region in the world.

Middle East and North Africa: Going by reported rates, HIV/AIDS has low incidence in these regions. However, inadequate surveillance and reporting shed no light, in what could be a more truthful picture.

High Income Countries: The antiretroviral therapy has considerably reduced HIV/AIDS related mortality, though in past two years a plateau has been reached. Transmission of HIV in western European nations is mainly through heterosexual intercourse. The epidemic is shifting to the poorer sections of the societies, for example African-Americans account for an about 54% of new HIV infections in the United States in 2000 even so they constitute only 13% of the population. In Japan the virus is spreading among young people and mostly males.

The HIV/AIDS spread across nations: It is useful to have a quick representative figure to compare and contrast where a nation lies with respect to the HIV/AIDS problem. In this paper the number of HIV/AIDS cases (men, women and children) as a percentage of the total population were computed from the HIV/AIDS cases reported by UNAIDS/WHO, 2002. Thereafter, a grouping of the most affected nations were made based on these computed figures. The corresponding tables and bar charts can be read from figures one to five.

Fig. 1 reports six countries with highest HIV/AIDS prevalence, namely Botswana, Swaziland, Zimbabwe, Namibia, South Africa and Zambia respectively with a prevalence of greater than 10%. Botswana leads the group with a total prevalence of 21.24. In Fig. 2 nations have a prevalence between 5-10% with Burundi, Cameroon, Central African Republic, Kenya, Malawi and Rwanda. Caribbean's Haiti and Pacific's Togo appear in the third most HIV/AIDS affected group of countries with prevalence between 3-5%. The remaining nations are all from the African continent. Fig. 4. with prevalence of 1-3% sees the spreading out of the problem to the Caribbean. Fig. 5 with prevalence of <1% is dominated by Caribbean and Latin America with the entrance of

Eastern Europe with Ukraine, Asia with India, Nepal and Vietnam and even the entrance of higher income countries like Spain, Portugal and Switzerland.

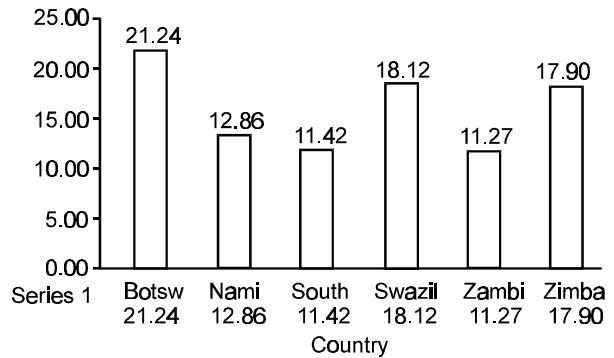


Fig. 1: HIV/AIDS Prevalence > 10%

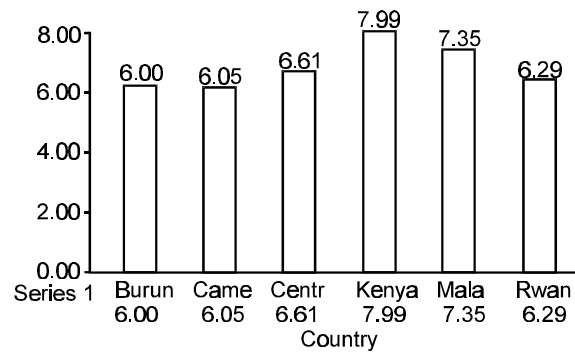


Fig. 2: HIV/AIDS Prevalence 5-10%

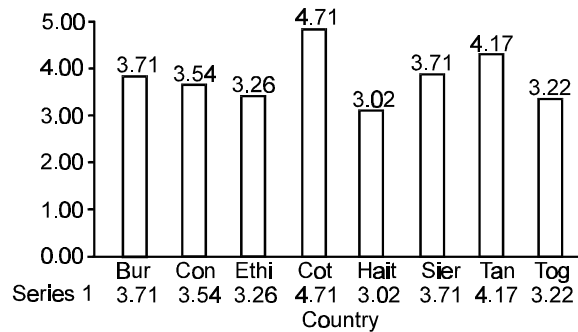


Fig. 3: HIV/AIDS Prevalence 3-5%

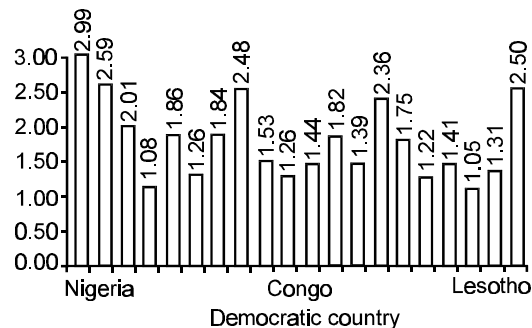


Fig. 4: HIV/AIDS Prevalence 1-3%

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Country	Prevalence 1 - 3%
Nigeria	2,99
Angola	2,59
Bahamas	2,01
Belize	1,08
Benin	1,86
Cambodia	1,26
Chad	1,84
Congo	2,48
Dominican Republic	1,53
Equatorial Guinea	1,26
Eritrea	1,44
Ghana	1,82
Guinea-Bissau	1,39
Guyana	2,36
Lesotho	1,75
Philippines	1,22
Sudan	1,41
Thailand	1,05
Trinidad and Tobago	1,31
Uganda	2,50

As these Figures indicate HIV/AIDS is at its worst in Africa. It then starts spreading out to the Caribbean, followed by Asia. The next most affected regions are South America and Eastern Europe, with an entry of Western Europe in the last category with Spain, Portugal and Switzerland. This is an overall indicator of how HIV/AIDS is distributed across nations.

Analysis of Poor versus Rich Nations: In the last analysis, it was seen that Spain, Portugal and Switzerland from Western European nations featured in the last category of <1% HIV/AIDS prevalence. However, none of the other Western European countries or the other richer nations from remaining parts of the world fell into this category. The higher income countries have HIV/AIDS cases, but distributed among total population it is not as a massive problem, as the other parts of the world; these other parts being poorer parts too. Also, the richer nations have fewer number of AIDS related deaths, in direct contrast to the poorer countries. The following group of four bar charts (refer Fig. 6, 7, 8 and 9) show the gap in resources, as in per capita income and per capita health expenditure, and the HIV/AIDS prevalence and AIDS deaths prevalence between the most richest countries of the world, comprising Group 1 and the most HIV/AIDS affected countries of the world, comprising Group 2.

Care should be exerted when interpreting these average data. These data are so good so as to compare average figures between two groups of nations, but to reduce the HIV/AIDS problem to these figures, for example the AIDS prevalence in Group 1 is zero, does not mean that there are no people suffering from HIV/AIDS in these countries, it is only that across the population and across the group, the representative figure is negligible. Care should be also exerted in describing HIV/AIDS affected countries. The group comprised of 21 nations with a prevalence of HIV/AIDS from 2.99 to 21.24%. The grouping cut-off point is arbitrary, and a change in the group structure, would mean a change in the derived statistics.

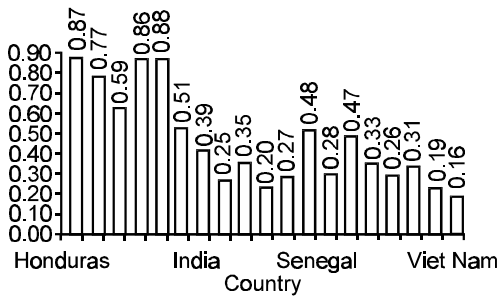


Fig. 5: HIV/AIDS Prevalence <1%

Country	Prevalence < 1%
Honduras	0,87
Jamaica	0,77
Mozambique	0,59
Panama	0,86
Suriname	0,88
Ukraine	0,51
India	0,39
Nepal	0,25
Papua New Guinea	0,35
Peru	0,20
Portugal	0,27
Russian Federation	0,48
Senegal	0,28
Somalia	0,47
Spain	0,33
Switzerland	0,26
USA	0,31
Uruguay	0,19
Viet Nam	0,16

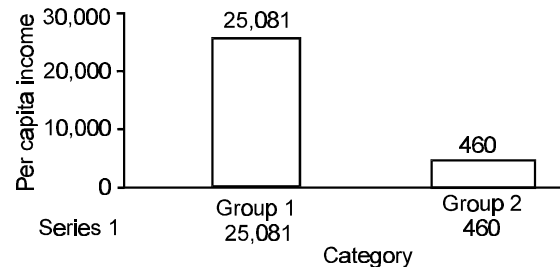


Fig. 6: Per capita real GNI (US \$, 2001)

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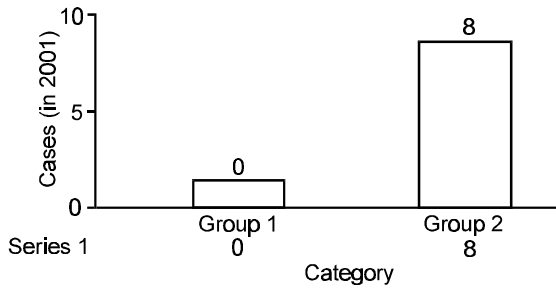


Fig. 7: HIV/AIDS Prevalence (% total population)

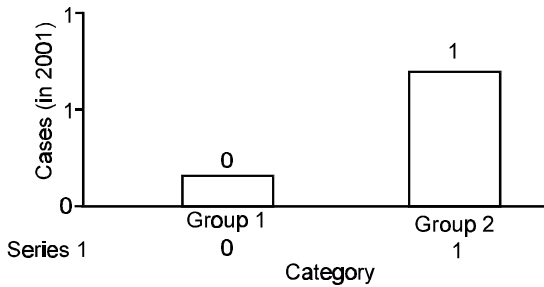


Fig. 8: AIDS Deaths prevalence (% of total population)

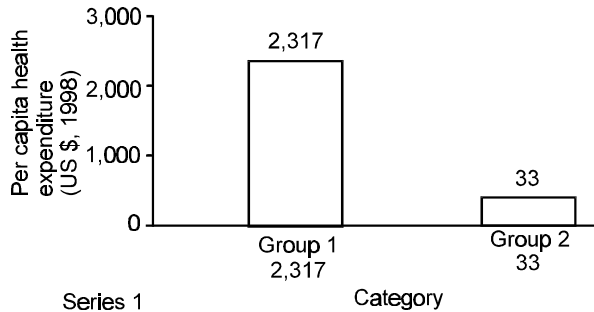


Fig. 9: Per capita health expenditure (US \$)

These Figures show countries with higher incomes and better medical care have lower HIV/AIDS prevalence and AIDS related deaths. Patients in higher income countries have better access to nutrition and medicine, thus the rapidity with which the disease can progress is mitigated given the resources available and disposable in these countries. In fact, as Barnett (2003c), from his study in Malawi reports that the “rich households are more able to cope with the stress of sickness...”, showing a better income status even within affected communities in lower income countries, have a better chance of dealing with HIV/AIDS.

Section II: Disease Aetiology and the Cycle: The single most dominant reason for the spread of HIV/AIDS is unprotected sexual intercourse with multiple partners which increases the risk of contracting the disease. Garnett *et al.*, 2001 describe this process clearly. They

put forward “infection in contacts” and “the chance of transmission during the contact” to be important towards contracting HIV/AIDS. The overall spread of the disease, caused by the infectious organism, depends on reproductive number, R_0 , which is the number of new infections caused by an infected individual in a susceptible population (Anderson and May, 1991). For an epidemic to result the R_0 should be greater than one. After the disease has spread, its growth is determined by “density dependent factors”, for example, immunity, prior infection etc. In the case of HIV/AIDS the typical pattern follows a bell shaped curve, in which, the disease, at first, progresses rapidly because the epidemic burns up the “at-risk pool”. This is followed by a decline because of “AIDS induced mortality” in the population. The disease would die whereby there would be a perfect bell shaped curve, but for the “recruitment of new at-risk population”. The next most determining factor is the “risk behaviour” of the population, which decides future disease path, and affects the second half of the bell curve. The curve may flatten out at various levels showing there are new HIV/AIDS cases. This rate of recruitment of new cases determines the steady state incidence. If given, everybody in the population had the same risk, a large epidemic would result, but risk behaviours are usually non-uniform (Garnett *et al.*, 2001). Loevinsohn and Gillespie (2003) reported that AIDS progresses in waves - HIV infection wave, opportunistic HIV infection wave, AIDS wave, death wave followed by impact wave. According to them some countries have crossed the HIV infection peak, but no country has crossed the mortality wave crest.

Bloom and Mahal, 1997 state in their paper that progression of HIV into AIDS is affected by high relative cost of per case medical care. To treat HIV/AIDS is costly, thereby national, community and household level income to counteract the disease plays a role in disease progression. Dixon *et al.*, 2001 cite an example. The cost of one year’s supply of AZT for one person in the United States was more than 1000 times the annual per capita health budget of Uganda in 1987. Poorer countries, communities and households with less disposable income will feel the debilitating effects of HIV/AIDS much earlier and in greater severity.

Once HIV has taken root, its progression to AIDS, is affected by nutritional status. A low nutritional status can precipitate the onset of AIDS from a state of HIV infection. In this way nutrition plays a role in disease aetiology. The exact nutrition-disease inter-linkages will be discussed in detail in section IV of this paper.

Section III: Disease Impacts: The impacts of HIV/AIDS are very well documented in published literature by a

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number of authors (Stokes, 2003; Barnett and Rugalema, 2003; Andersen and Brunne, 2002; Garnett *et al.*, 2001; Barnett and Rugalema, 2001; Gillespie *et al.*, 2001; Haddad and Gillespie, 2001; Saasa, 2001; White and Robinson, 2000). A range of sectors from the broad macro-environment to the micro-environment get affected as a result of HIV/AIDS (Loevinsohn and Gillespie, 2003; Stokes, 2003; Andersen and Brunne, 2002; Gillespie *et al.*, 2001; Haddad and Gillespie, 2001). Different authors categorize differently and to consider a single factor would be an incomplete understanding of the problem. But a more-or-less recent synopsis of the impacts of AIDS/HIV has been put forward by Stokes, 2003.

Synopsis of Impacts of AIDS/HIV, (Stokes, 2003)

Human capital effects

Household: e.g. illness, death, orphans etc.

Community: e.g. change in nutritional status, migration etc.

Financial capital effects

Household: e.g. reduced incomes, borrowing, liquidation, etc.

Community: e.g. credit price increases, increase in default etc.

Natural capital effects

Household: e.g. reduced soil fertility, biodiversity, sale of land, etc.

Community: e.g. increase in fallow land, change in land use, etc.

Social capital effects

Household: e.g. relationships with extended family/community, etc.

Community: change in labour sharing, kinship, etc.

Physical capital effects.

Household: sale of assets like livestock, equipment, etc.

Community: Declines in infrastructure like roads, well, etc.

Haddad and Gillespie (2001) in addition to the above points, also put forward four other. These are: impacts on the rules governing access to assets and their value to livelihood generation, cultural norms and values, organizations and impacts on agriculture and nutrition. More recently, Loevinsohn and Gillespie (2003) have put forward the complex relationship, as to what causes HIV/AIDS and what are the impacts of HIV/AIDS. These relationships appear as two separate diagrams in their paper. In this paper, the two diagrams, the left side credit to Barnett and Whiteside, 2002 and the right to Loevinsohn and Gillespie, 2003 have been put together as in Fig. 11, to get the complete picture.

Once the impacts of HIV/AIDS are felt, they start a secondary cycle of disease, for example HIV/AIDS results in migration. This process brings in newer communities into the HIV/AIDS fold resulting in a greater spread of the disease as reported in Gillespie and Haddad (2001-2002). The aetiology, spread and impact of the disease is complex. Further, AIDS-related morbidity and mortality is disproportionately represented in prime-age population (Bloom and Mahal, 1997). Stokes, 2003 mentions seven million agricultural workers who have died from AIDS since 1985 and another 16 million of agricultural labour in Sub Saharan Africa could die by 2020 (FAO estimates). Thus the impact on each aspect of society falls harder, as it is the productive age population that disappears, with that knowledge and societal functionality.

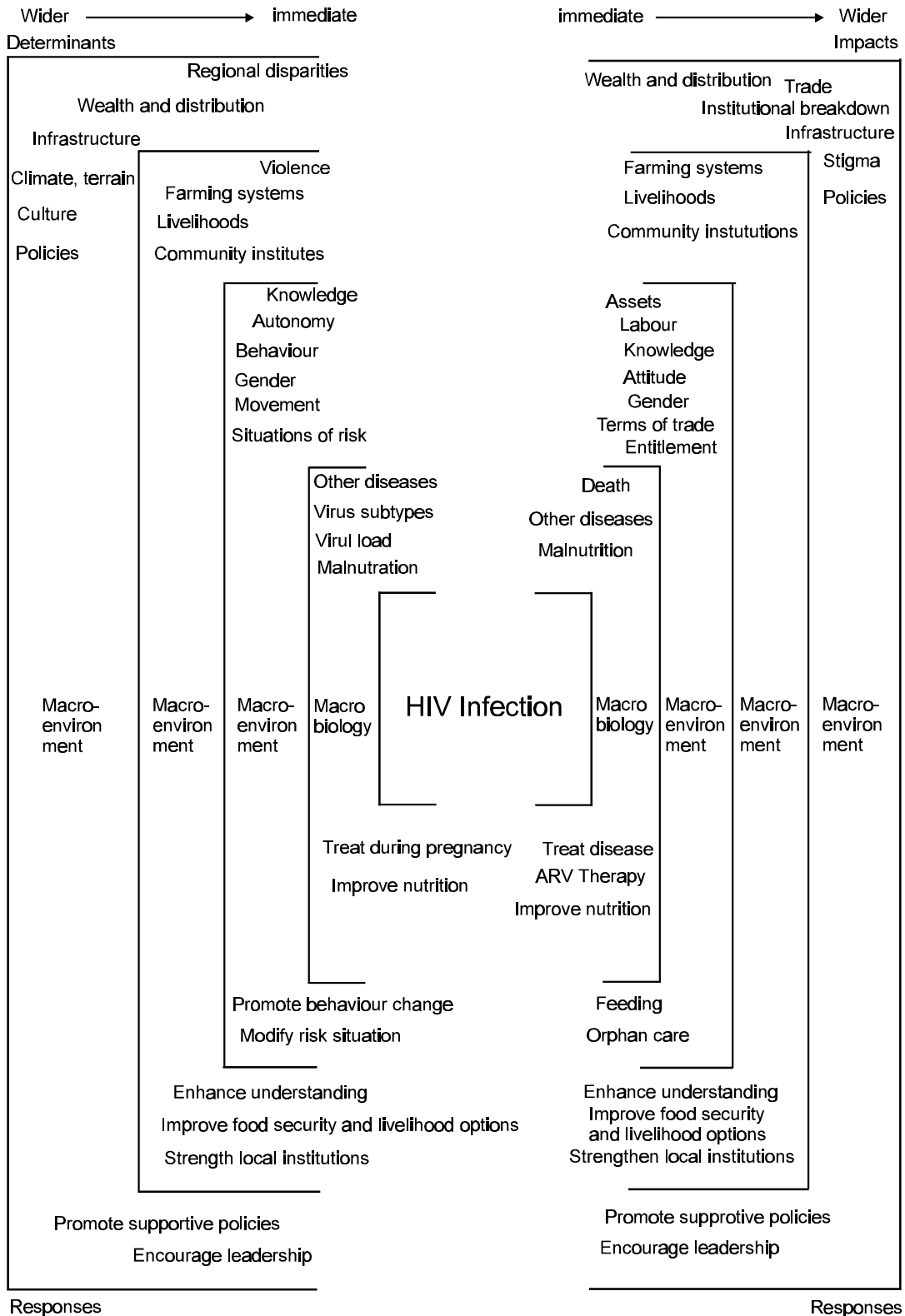
However, different countries/regions/communities respond to this shock with different means and measures. The consequences of AIDS are shaped by the factors of labour saving technologies, social security and the pre-existing food insecurity (Loevinsohn and Gillespie, 2003). Such are the factors which need to be identified in order to determine why certain countries/regions/communities can cope with HIV/AIDS impacts while other fall prey. In this milieu, nutrition, appears to be playing an important role.

Section IV: Nutrition - a common man's answer to the HIV/AIDS problem?:

As Fig. 6, 7, 8 and 9 show high income countries are better able to deal with the HIV/AIDS problem compared to lower income countries, albeit not the most effectively till such time the fail-safe medicine is discovered. This is seen in the lower HIV/AIDS spread and lower HIV/AIDS related deaths in higher income nations. However, HIV/AIDS is more prevalent in the lower income nations. A major cause for longevity of HIV/AIDS patients in higher income countries is the availability and affordability of the retroviral drugs, and while the drug's availability for all remains an ideal; practical considerations for the immediate future need to be considered. The fact is very few people in Africa have access to these drugs as reported by UNAIDS/WHO 2002. Thus, what else is different other than expensive medicines in the higher income countries which perhaps could be sooner and easily provided to the lower income countries to combat HIV/AIDS? Dixon, 2001 warns on the necessity of cost-effectiveness of various interventions, in order to maximize the impact of prevention and treatment programmes.

On the HIV/AIDS impact side the first pressure of the disease is felt in food, hence also nutrition; peoples' main concern and means of survival. But nutrition plays a role at the causation side too. In fact, there is a central

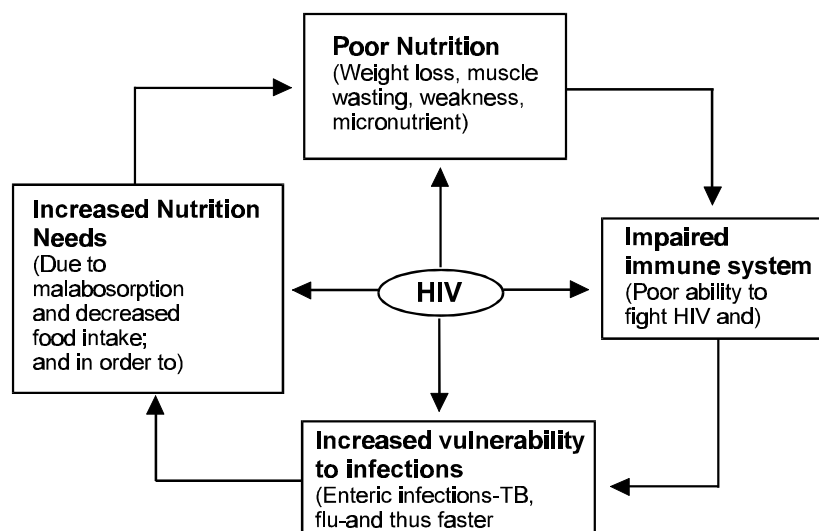
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Ref: Left side: adaptation from Barnett and Whiteside, 2002; right side: Loevinsohn and Gillespie, 2003a

Fig. 10: HIV/AIDS Epidemic: Determinants and genetic responses, and impacts and generic responses

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Ref: Handbook-Developing and applying National Guidelines on Nutrition and HIV/AIDS, RCQHC and FANTA project, 2003)

Fig. 11: The cycle of malnutrition and infection in the context of HIV/AIDS

relationship between HIV/AIDS and nutrition, as reported in literature in Fig. 11.

On the causation side: Scrimshaw *et al.*, 1968 reported the close interdependency between disease and nutrition. No matter how mild the infectious disease is, it affects the nutritional status and also, almost any nutrient deficiency, if sufficiently severe, will impair resistance to infections (Scrimshaw and SanGiovanni, 1997). Likewise in the case of nutrition and AIDS, which is further acerbated as AIDS suppresses body immune system (Semba and Tang, 1999), so that the body is not able to withstand a whole range of infections, including HIV viral strains. Further, HIV/AIDS results in an increase in the risk to malnutrition and malnutrition exacerbates the impacts of HIV/AIDS resulting in further deterioration of the nutritional status (WFP Policy Issues, Agenda Item 4, 2003).

Infections affect nutritional status by

- C Reducing dietary intake and nutrient absorption
- C Increasing the utilization and excretion of protein and micronutrients
- C Promote anorexia, fever and catabolism of muscle tissue
- C Release of pro-oxidant cytokines and other reactive oxygen species leading increased utilization of "antioxidant" vitamins as well as minerals, which are used to form antioxidant enzymes (Friis and Michaelsen, 1998).
- C Oxidative stress because of imbalance between the

pro-oxidants and antioxidants resulting further cell, protein and enzymatic damage (Schwarz, 1996). (Source: Piwoz and Preble, 2000)

On the impact side: Semba and Tang's (1999) diagram shows what HIV/AIDS results in at the individual nutritional level (refer Fig. 12). The nutritional requirements of the HIV/AIDS infected patient alters tremendously, not only in their micronutrient requirement but also with regards to protein and energy consumption levels.

For HIV/AIDS affected individuals it has been recommended:

- C More energy (10 - 15% increase) and protein (50% increase).
- C Increasing consumption of food containing antioxidants, like vitamins A, C and E, β -carotene, B vitamins, selenium and zinc.
- C Support indigenous foods and traditional herbal therapies, having tested their safety, efficacy and quality.
- C Supporting food aid.

Source: WFP Policy Issues, Agenda Item 4, 2003, Sherlekar and Udipi, 2002, Statement SADC Meet, 2003, FANTA and AED, 2002.

ACC/SCN, 1998 reported that the chance of HIV infection can be reduced in individuals with good nutritional status, the central role being played by vitamin A. The progression of the disease to AIDS and even death

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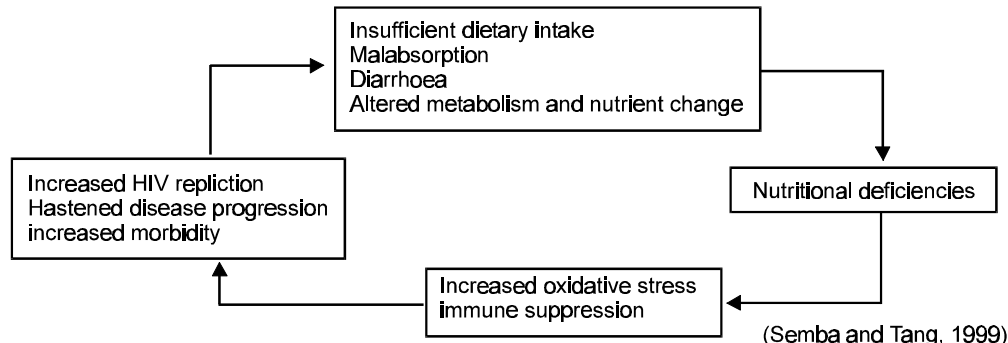


Fig. 12: Malnutrition and HIV: the vicious cycle

might be delayed in well nourished HIV patients. Timely nutrition interventions can mitigate HIV/AIDS (Haan *et al.*, 2003) and such interventions should be resorted to (Loevinsohn and Gillespie, 2003; Piot and Pinstrup-Andersen, 2001-2002; FANTA - AED, 2000). This is so as nutritional support prolongs life of HIV/AIDS infected/affected individuals for the patient's own benefit and for those dependent on them and thereby it prolongs the period of "relative health with asymptomatic infection" (Piwoz and Preble, 2000). AIDS and death might be delayed by well-nourished HIV infected population, because diets rich in carbohydrates, protein, vitamins and minerals can help to prevent secondary infections because of reduced immunity as a result of HIV (Gillespie and Haddad, 2001-2002). Malnutrition shortens the asymptomatic period of HIV infection, precipitates the onset of AIDS, death and could also increase the risk of mother to child transmission.

Nutrition in the role of prevention and mitigation of HIV/AIDS:

Gillespie *et al.*, 2001 noted, "Evaluation of AIDS mitigation with nutritional intervention; this work must begin". Gillespie and Haddad (2001-2002) report that malnutrition and food insecurity lead the community to adopt measures that increase the risk of HIV transmission, e.g. migration for work, which, as discussed in section III, further results in the disease spreading out. In contrast to this, HIV/AIDS also precipitates/worsens malnutrition. As the WFP Policy Issues, Agenda Item 4, 2003 says, poor people who are HIV/AIDS affected need both treatment and food. Food and nutrition is relevant to treatment, only it is still not known how and to what extent treatment efficacy is compromised by poor nutritional status (Loevinsohn and Gillespie, 2003)

Community level food security: Loevinsohn and Gillespie, 2003 in their working paper say that HIV/AIDS threatens food security by eroding social security

networks, which is seen as an important social capital. Topouzis, (2001) reported the strategies to improve food security and nutrition in households affected by HIV/AIDS by:-

- C Use of improved crop management and plant varieties with higher yields.
- C Emphasis on staple crops.
- C Improved agricultural practices and technologies to save labour and capital.
- C Use of small ruminants for consumption, sale and manure.
- C Nutritional gardens.
- C Nutrition education.
- C Labour exchange arrangements.
- C Increased access to agricultural extension services that address needs of households affected by HIV/AIDS.
- C Changes in gender roles.

As it has been seen nutritional intervention alone will be not enough, but within a framework of measures ranging from macro-environment to the individual, nutrition comes forward to combat HIV/AIDS effectively. Longitudinal clinical and socio-economic studies are called for. However, the aspect of extremely long incubation period of HIV/AIDS virus with the practical difficulties of running a longitudinal study, introduce potential problems. These longitudinal studies none-the-less are still required and remain an objective. Cross sectional data and studies are the fall-back policy, as the best option is still not the viable one. Also the use of indices and representative community responses are useful methods to elicit information. It is not without its disadvantages. Introduction of error due to inclusion of a certain percentage of cases which are non-HIV/AIDS but still get read as HIV/AIDS infected/affected can not be avoided. But across large number of populations, the general trend will be reflected, in spite of the inbuilt errors. In the next section certain such initial measures to analyze the HIV/AIDS problem have been used.

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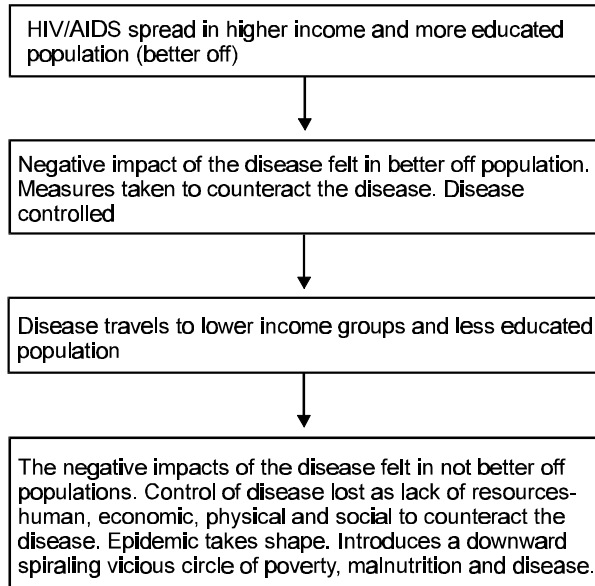


Fig. 13: The spread process of HIV/AIDS

Section V: Correlation studies: Barnett, 2003c reported for Kenya that there was a positive correlation between HIV infection and socio-economic status, such as education and income. That is higher the income and higher the education, greater was the prevalence of HIV. It has been reported that initially HIV/AIDS spreads faster in higher income and educated population, but this group respond faster to the negative effects of the disease (Gregson *et al.*, 2001 as reported in Dixon *et al.*, 2001; Barnett, 2003c). It can be seen akin to a trend that spreads faster in the better-off society, but the moment the negatives of the trend are noted, the better-off society moves out of it and the problem is controlled in that socio-economic group. In the time passed though the trend travels to lower income and education groups, and the control of the problem becomes difficult, since the resources to deal with the problem are not there. Like wise in the HIV/AIDS scenario (refer to Fig. 13).

Loevinsohn and Gillespie, 2003 stated the various inter-relationships coming into play in causes and consequences of HIV/AIDS, showing the multi-aetiological and the multiple impacts nature of the disease (Fig. 10). But, even so the spread of the disease is multi-aetiological, the authors have narrowed down the prime factors to poverty and inequality, as represented in measurements of income, health and education respectively.

This study ran correlations between HIV/AIDS and real per capita gross national income (GNI). The relationship was inverse, i.e. as GNI increased, HIV/AIDS decreased. But, the correlation coefficient was not significant. These results are in consistency with the figures reported by other authors. HIV/AIDS still does not affect a country's GNI and GDP, across a cross-section of countries (du

Guerny, 2002; Bloom and Mahal, 1997). A possible explanation is that HIV/AIDS is still not the full blown problem that it can become, and in present times, it is still not significantly correlated with GNI.

Like wise, the relationships between HIV/AIDS and per capita health expenditure, and HIV/AIDS and secondary school enrolment had insignificant correlation coefficients, even so an inverse relationship existed. As HIV/AIDS increased, per capita health expenditure and secondary school enrolment decreased, but not significantly. Yamano and Jayne (2002) reported positive correlation between male HIV infection and socio-economic status, as measured in terms of education and income. A positive correlation is also reported in Barnett (2003c). However, Yamano and Jayne (2002) also found, that among prime age women, the distribution was more even, no clear correlations, across all income quartiles; not the clear positive correlation as was found in the case of men. In the present study correlations, HIV/AIDS cases cohort included men, women and children across the cross-section of nations. These can average out effects. Another likely factor will be the inclusion of nations which can cope with HIV/AIDS, as in the high income-resource-rich countries, in the correlations run. On the other hand the results are more general population reflective. Piot, and Pinstrup-Andesen (2001-2002) state that HIV/AIDS, like malnutrition, is complex.

The third correlation between HIV/AIDS and malnutrition was also not significant, even so the correlation coefficient was much larger as compared to the first three correlations. The relationship was positive, i.e. as HIV/AIDS increased, malnutrition also increased. The larger coefficient, even so still not significant as compared to the other correlation coefficients, could imply that malnutrition is playing an increasingly important role in HIV/AIDS.

These preliminary investigations show that HIV/AIDS is still not exhibiting patterns, of any significance, across country data. Cross-sectional, cross-country studies have usually reported non significant relationships between various measures and HIV/AIDS. However, if HIV/AIDS continues to spread at the rate it is and as prognosis studies show (Barnett, 2003b), then the results could be changing. The correlation results in this paper can introduce a certain degree of calm in dealing with the problem. On the other hand it could be that HIV/AIDS is just in its initial wave progressing to encompass all aspects of society, as reported in the prognosis study. In this study, the correlation coefficients carry the expected sign and it might be a matter of time that they become significant. In this respect nutrition could be leading the march to combat the disease.

Conclusion and Some Policy Implications: As last section and all the preceding sections show the

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HIV/AIDS time bomb is ticking. It might put communities at rest to find that the studies still have to report significant results to empirically prove the case. But the shift towards empirical significance has already begun as reported in small community studies (Barnett, 2003c; Yamano and Jayne, 2002) and prognosis studies (Barnett, 2003b). Even the correlations run in this working paper while on one hand they were not significant, which is positive, as it means the problem is not as widespread or severe, but the correlations carry the expected sign, which could mean, none-the-less, the society is heading towards this disaster, if prior, timely measures are not taken. The millennium Y2K problem was avoided because of judicious, advance action. While that proved a dampener to the Malthusian harbingers, it showed a problem can be contained and controlled. As already previously stated in the paper, Loevinsohn and Gillespie, 2003, akin HIV/AIDS progression in waves, but the still unmentioned final wave "may include social and political destabilization" not merely a mere "individual health problem". Vigilance is not good, it is the order of the day and insignificant empirical results introduced somnambulism is to be avoided. Besides figures do not mitigate the human suffering, when faced with decisive debilitation, dying and untimely death.

HIV/AIDS is a global problem, with global spillovers, therefore it is worth to invest time, energy and effort as in interventions and research, and finances into it. It is multi aetiological and requires multiple pronged approach to deal with it. This disease also requires a cure. Till such time the wonder cure be discovered, nutrition is useful in the disease prevention and mitigation. This calls for at the individual, community, national and international levels commitment both (a) in terms of timely interventional support for the HIV/AIDS affected and infected population to alleviate suffering and (b) quality research in the field. Each of these should feed into the other, synergistically, research feeding into interventions and interventions feeding into further research. These should be conducted, considering the political, institutional, social, economic, environmental environments, in which the epidemic exists, as these factors can lead to or precipitate HIV/AIDS. The direct aetiological factors arise at the individual level. Impacts of HIV/AIDS are felt in all aspects of life and livelihoods.

The present paper, supports the role of nutrition as a pivotal point of intervention, and research for both HIV/AIDS prevention and mitigation. It not only makes nutritional and clinical sense in the intervention strategy but also a convenient, locally available strategy and internationally possible objective to counteract the HIV/AIDS virus, till cure is available and even after, as a good nutritional status complements medicinal intervention.

Policy recommendations have been made by most authors. For example, recently, Haan *et al.*, 2003 identified both nutrition policy and food aid policy as part of their policy recommendations. But follow-up on these recommendations made, augurs well for the community. For example, Saasa (2001) had recommended "robust, timely, and dependable monitoring and evaluation...."; this being tended to by the Sentinel surveillance, which is a positive outcome.

Recently there has been clinical good news with the discovery of an AIDS virus strain in blood samples from Malawi that has not survived in the blood samples of the nineties decade, by McCormack, G. (The Irish Times, June 30, 2003). It hopes to open doors to find a cure for this modern day plague. Till that is found nutritional intervention possibly will go a good way to prevent and mitigate the disease. If the tendency is to continue to fight the HIV/AIDS before its massive social disruption effects take place, and then when it should not happen, it will be real reason to celebrate.

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