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Infections and inequalities: anemia in AIDS, the disadvantages of poverty

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ABSTRACT

Objective: To study anemia in AIDS patients and its relation with socioeconomic, employment status and educational levels. **Methods:** A total number of 442 patients who visited the Infectious Diseases University Hospital in Buenos Aires, Argentina were included in the study. Patients were divided into two groups, i.e. one with anemia and the other without anemia. Anemia epidemiology and its relationship with educational level, housing, job situation, monthly income, total daily caloric intake and weekly intake of meat were evaluated. **Results:** Anemia was found in 228 patients (54%). Comparing patients with or without anemia, a statistically significant difference was found ($P < 0.0001$) in those whose highest educational level reached was primary school, who lived in a precarious home, who had no stable job or were unable to work, whose income was less than 30 dollars per month, whose meat consumption was less than twice a week or received less than 8000 calories per day. **Conclusions:** The high prevalence of anemia found in poor patients with AIDS suggests that poverty increases the risk to suffer from this hematological complication. The relationship between economic development policies and AIDS is complex. Our results seem to point to the fact that AIDS epidemic may affect economic development and in turn be affected by it. If we consider that AIDS affects the economically active adult population, despite recent medical progress it usually brings about fatal consequences, especially within the poorest sectors of society where the disease reduces the average life expectancy, increases health care demand and tends to exacerbate poverty and iniquity.

1. Introduction

Decades have passed since the onset of the HIV virus. About 33.3 million people are infected or living with HIV, of which 22.5 million are in sub-Saharan Africa. In addition, of the 2.5 million children in the world who are estimated to be living with HIV, 2.3 million are in sub-Saharan Africa. Southern Africa, the most affected region, includes a number of middle- and lower-middle-income nations known as the hyperendemic countries[1]. Only in South Africa, there are

about 5.7 million people living with HIV/AIDS. About 90% of new infections occur in developing countries, where in some cases the disease has already reduced life expectancy by over 10 years. HIV has become generalized in many nations, and in other poor regions in the world, the disease could be about to spread without control[2]. While the causality between poverty and HIV is not clear, it is certain that HIV pushes households and individuals into poverty. The aim of this study was to evaluate anemia epidemiology in patients with AIDS and its relationship with socioeconomic levels and job situation.

2. Materials and methods

Between January and December 2010, 442 patients with AIDS who visited the Infectious Diseases University Hospital in Buenos Aires, Argentina were included in the

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study. The project was approved by the hospital's Ethical Committee and conducted under regulations governing research in human beings. Before commencement of this study, an informed consent was obtained from each patient. Patients were divided into two groups, *i.e.* AIDS with anemia and AIDS without anemia. Anemia was defined as haemoglobin (Hb) <10 g/dL. Data of two groups were compared in the different categories in each studied variable and the difference of proportion test was applied. Inferential statistics based on calculation of probabilities were used and normal distribution was also used because large samples had to be dealt with, and arithmetic mean and SD were used as parameters. Whether there were significant differences at

$P=0.02$ for every observation unit and research variable was established.

3. Results

Among 422 patients with AIDS, 228 (54%) suffered from anemia with mean Hb at $(7.90 \pm 0.98 \text{ g/dL})$, 85 of them were men and 143 were women (37.28% and 62.71%, respectively). Mean age of all patients was (26.5 ± 2.3) years, (29.0 ± 3.5) years for men and (24.0 ± 6.3) years for women. The relationship between anemia and socioeconomic, employment status and educational levels was shown in Table 1.

Table 1

Relationship between anemia and socioeconomic, employment status and educational levels.

Independent variables		Patients with anemia	Patients without anemia
Educational level	Illiterate or with primary schooling	65.4%	20.6%****
	Secondary or university studies	34.6%	32.0%
Housing	Homeless	6.1%	1.5%****
	Shanty or prefabricated house	79.8%	32.0%****
Job situation	Brick and mortar house	13.2%	66.5%****
	Unemployed	17.5%	28.4%****
	Temporary job	11.0%	17.5%
	Disabled	45.6%	4.1%****
	Steady-job	25.9%	50.0%****
	Income		
	<30 dollars/month (d/m)	55.7%	7.7%****
	31–110 d/m	20.2%	14.9%
	111–300 d/m	10.5%	26.8%****
	>300 d/m	13.6%	50.5%****
Intake of meat	<twice a week	62.3%	22.7%****
	3–5 times a week	27.6%	33.5%
	Every day	10.1%	45.9%****
	Daily caloric intake		
	<800 calories/day (c/d)	32.9%	12.4%****
	800–1500 c/d	44.7%	37.1%
	>1500 c/d	22.4%	50.5%****

****: $P < 0.0001$ comparing with patients having anemia.

4. Discussion

Four hundred and forty-four patients with AIDS were studied with anemia detected in 228 (54%) patients. When patients with and without anemia were compared, where primary schooling was the highest educational level reached, housing was poor, individuals were jobless or unable to work, income was below 30 d/m, their intake of meat was below 2 days a week and caloric intake was below 800 c/d, statistical difference was highly significant ($P < 0.0001$). Our results show that these 2 different socioeconomic-cultural populations have only one thing in common, *i.e.* an HIV diagnosis. High prevalence of anemia in AIDS patients suggests that poverty increases the risk to suffer from this hematological complication[3].

The strength of the observed association, obtained as a result of the greater significance of P found in several studied variables, allows to infer that the association is real. Other aspects should be taken into account, too: 1) the biological plausibility of the observed association is a meaningful relationship; 2) regarding the biological gradient of the observed association, there is a relationship between the extremes (> poverty and < educational level = > risk of anemia); and 3) the consistency of our research findings with which is known about the natural history of the disease. In fact, poverty produces not only direct effects but also non financial costs, such as hunger, undernourishment and malnutrition, which contribute to arise feelings of deprivation and frustration, apart from pain, suffering and reduced life quality[4]. Impoverishment, life conditions on the borders of survival and social inequality have a high negative impact on the health of AIDS patients and increase

their vulnerability to anemia^[5]. Because those acquiring the disease are mainly adults in their most productive period in life, AIDS produces, economically speaking, very severe consequences not only for the affected individual but also for the other family members, namely children, a fact that could further exacerbate poverty and iniquity^[6]. No doubt, the human cost of the epidemic is huge.

Although arguments in favor of state intervention to face HIV/AIDS epidemic are undeniable, nonobservance of the laws and political interests poses extraordinarily hurdles to the application of AIDS policies^[7]. No doubt, the advantages of state intervention are bigger because the potential seriousness of the problem has not become patently obvious^[8]. Governments are bound to support and subsidize prevention campaigns in order to reduce risk, especially among those who are more exposed. However, in Argentina, health policy makers have shown to be somehow reluctant to get involved. Thus, in these recent 10 years of democracy, the different ministers have faced the struggle for scant public resources and, probably thinking that HIV/AIDS spreads mainly through sexual intercourse and i.v. drug abuse, they might have concluded that the infection is neither a priority nor a threat to public health^[9]. Political leaders, authorities, economists, members of the society and HIV affected people must join efforts to face AIDS epidemic^[10].

Finally, fairness and compassion (which means suffering with) for the poor justify prevention and relief of the epidemic by the state. Policies aiming at reducing poverty will lower economic obstacles hindering the access of the poor to basic services of prevention and treatment of HIV^[11]. Moreover, fostering development and reducing the speed of virus propagation may offer many additional benefits. While these benefits are sometimes difficult to quantify, they will be complemented by policies that have direct effects on the cost and benefits implied in the adoption or not of risky conducts^[8].

What strategies should governments apply to obtain, despite limited resources, the best possible results in AIDS prevention? According to the principles of public sector economy, governments must guarantee the funding of measures that are essential to stop HIV propagation. For lack of adequate incentive, private companies or individuals are not prepared to fund or else apply these measures themselves^[3]. These interventions would include, for example, reducing negative attitudes leading to risky conducts in people. Reducing negative attitudes strongly justifies subsidizing measures aimed at promoting safer behavior among individuals who are more exposed to contracting and spreading HIV. The consequences of HIV/AIDS affect those who contract the disease in the first place^[12]. Drugs administered to alleviate symptoms and treat opportunistic intercurrent disease may palliate suffering

and prolong the productive life of infected individuals, sometimes at a low cost^[9]. Measures to protect the poor from the effects of an HIV/AIDS epidemic should never be neglected. This could be enough to put a considerable curb on the progress of a potential epidemic^[13].

In order to maximize the impacts of slender available resources, public prevention programs must avoid the greatest possible number of HIV secondary infections or complications (such as anemia) per currency unit invested by the state^[14]. Moreover, priority must be given to state intervention increasing (not substituting) private and public health care systems^[15]. AIDS prevention programs usually offer important social benefits, apart from preventing the epidemic; these benefits, and the synergy between interventions and policies, must be taken into consideration when assessing cost and benefits^[16]. Some interventions, as reproductive health services and HIV/AIDS education at schools, offer wide social benefits apart from those directly connected with AIDS prevention and are low cost, and that is why they usually represent good investment for politicians^[17]. The criteria used to direct the programs toward certain beneficiaries are not perfect and, as a consequence, the provision of helping those who are more exposed and vulnerable, as the poorest sectors of society are, may be difficult^[18]. In many cases, it is possible to increase cost-effectiveness of official AIDS prevention programs through the joint efforts of NGO and severely affected people in the designing and execution of these programs^[2].

The economic impact of HIV/AIDS presents huge challenges. While the causality between poverty and HIV is not clear, it is certain that HIV pushes households and individuals into poverty. While many illnesses create catastrophic expenditures which can result in poverty, HIV/AIDS is among the worst because its victims are ill for a prolonged period of time before they die, and many are the chief household income earners^[19]. In our country, the HIV/AIDS epidemic is evidently focused on the poorest sector, where the infection has been generalized and is producing the worst consequences. In fact, the effectiveness of health programs in ensuring the access of the poor to the best possible health care in AIDS has never been assessed. It is clear that the government must control that costs and effects of state interventions are closely watched so that the cost-efficiency ratio may be increased^[4].

There are many NGO that may contribute or are contributing to these efforts. Among them, enterprises, non-profit entities, private charitable organizations, foundations and “common interest groups” are made up of HIV/AIDS affected people. These organizations have made important contributions to fight against the epidemic^[1]. According to our investigation, the epidemic made an important impact on homes and, in general, on the magnitude and depth of national poverty. Homes and families have made up for the

loss of their adult members for AIDS the best they could. They have re-distributed resources, for example, by taking children out from school to help at home, by increasing the number of working hours, readjusting the number of persons in the household, selling family goods and requesting financial help and in kind to family and friends[5]. For the poorest families, it is more difficult to face this situation as their resources are scant or nonexistent. Children may be affected for life because of malnutrition or lack of schooling[12]. At the same time, there are many equally poor homes where, despite AIDS not having taken a toll, children are similarly handicapped due to their extreme poverty[7].

Simultaneously, some households have enough resources to face the death of an adult member without having to resort to official or NGO's aid. Therefore, authorities will generally reach their aims in matters of fairness more effectively if when focusing their help they take not only poverty indicators into account but also the presence of AIDS in the homes[10]. It is essential that available resources reach the homes of the neediest people through the combination of poverty reduction programs and measures mitigating the impact of HIV/AIDS epidemic. I believe this research points to a group of people who are particularly vulnerable to HIV/AIDS because of poverty and who are suffering its devastating results. This research offers an analytic frame to decide which governmental interventions should be given top priority to combat the epidemic[5]. We are the first generation to possess the resources, knowledge and skills to eliminate poverty. Experience shows that where there is strong political resolve, we see progress. And where there is partnership, there are gains[14].

The world has been living with the HIV/AIDS epidemic for some thirty years, and prevention methods have been scientifically proven and disseminated to the public for nearly as long[1–3]. Yet, there are, according to the Joint United Nations Programme on HIV/AIDS (UNAIDS) High Level Commission on HIV Prevention, at least 7000 new HIV infections every day –an alarming number that indicates HIV/AIDS awareness is at an unacceptable level of neglect by governments, civil society, and the private sector[20]. In September 2011, we will have a historic opportunity to build on and improve the performance of the past three decades. The promises world leaders will make, and words they will speak, will define the decade ahead: the decade that I believe will signal the beginning of the end of AIDS[1].

Conflict of interest statement

We declare that we have no conflict of interest.

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