Chronic noncommunicable diseases and HIV-AIDS on a collision course: relevance for health care delivery, particularly in low-resource settings—insights from South Africa

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ABSTRACT

Sub-Saharan Africa is experiencing a multiple disease burden. Non-communicable diseases (NCDs) are emerging, and their risk factors are becoming more common as lifestyles change and rates of urbanization increase. Simultaneously, epidemics of infectious diseases persist, and HIV/AIDS has taken hold in the region, although recent data indicate a decrease in new HIV infection rates. With the use of diabetes as a marker for NCDs, it was estimated that the number of people with diabetes would rise between 2000 and 2010 despite the HIV/AIDS epidemic, largely because of the aging of the population and the increase in risk factors for diabetes in South Africa. These numbers are likely to increase further, given the declining HIV/AIDS mortality rates and longer life expectancy due to the up-scaling of antiretroviral therapy (ART), with its concomitant metabolic complications. Given that treated HIV/AIDS has become a chronic disease, and the health care needs of people on ART resemble those of people with NCDs, and given that vertical programs are difficult to sustain when health systems are underresourced and strained, there is a powerful argument to integrate the primary level care for people with chronic diseases, whether they be NCDs or infectious diseases. Pilot studies are required to test the feasibility of an integrated service that extends from health facilities into the community in a reciprocal manner based on the WHO Innovative Care for Chronic Conditions model of care. These will begin to provide the evidence that policy makers need to change the mode of health care delivery. Am J Clin Nutr 2011;94(suppl):1690S–6S.

INTRODUCTION

Sub-Saharan Africa is in the midst of a rapidly evolving and seemingly truncated health transition. The more traditional infectious diseases such as malaria and tuberculosis have been joined by HIV/AIDS, and these occur concurrently with chronic NCDs. Not only does the region represent a major contributor to the global burden of malaria and tuberculosis, in 2009 sub-Saharan Africa had the largest number of people living with AIDS globally, ~22.5 million (range: 20.9 million–24.2 million). On a national level, South Africa is still the largest contributor to the HIV epidemic, with ~5.6 million (range: 5.4 million–5.8 million) infected (1). NCDs encompass a broad grouping of conditions that includes mental illness, neurologic disorders, CVD, pulmonary diseases, cancer, and diabetes, and the last 4 share the common risk factors of poor nutrition, physical inactivity, and tobacco use. NCDs accounted for 23% of deaths in sub-Saharan Africa in 2005 and NCD deaths are expected to increase at a much greater rate than are deaths from infectious diseases (2). In the next 10 y diabetes is expected to increase by 42% (2). This article seeks to describe the current status of the NCD epidemic in South Africa, focuses on CVD and its risk factors and the effect that the HIV/AIDS epidemic may have on NCDs (with the use of diabetes as a marker for these conditions), and finally, it addresses the argument for an integrated model of care for HIV/AIDS and NCDs in the region.

South Africa, unlike the rest of the region, has the benefit of a reasonably well-developed program for the collection of vital statistics. In combination with other epidemiologic data and after adjustments for underregistration and misclassification of causes, these vital statistics have permitted the characterization of the country’s multiple disease burden. The South African Burden of Disease Study for the year 2000 showed that HIV/AIDS accounted for 25% of deaths and 31% of disability-adjusted life years, as seen in Figure 1. NCDs accounted for 37% of deaths and 16% of disability-adjusted life years (3). Notably, a marked differential in mortality rates is evident in the country at a provincial level as a result of the striking variation in HIV/AIDS mortality [Figure 2 (4)]. The more rural and financially impoverished provinces such as Mpumalanga and KwaZulu Natal have the highest HIV/AIDS mortality rates. HIV and other infectious disease rates are lowest in the populations that live predominantly typical Western lifestyles (eg, Western Cape Province), which have a higher average income level. Yet NCD mortality rates are substantial across all the provinces, with little...
difference in the rates. A similar phenomenon of comparable mortality rates for NCDs, despite widely different levels of affluence, is seen in the suburbs in cities such as Cape Town and is likely to reflect the national trend for the next few decades (5).

NCDS AND THEIR RISK FACTORS

Aside from the mortality data, there are no routine South African national data on the prevalence of NCDs, including diabetes. However, in 1998 the Demographic and Health Survey showed that the national prevalence of hypertension in people >15 y old was already 21% (6). Although global estimates of the trends in BP indicate that internationally there has been a decrease in BP levels (7), for South Africa there may have been a slight increase, based on the 2008 National Income Dynamics Survey. This survey suggests that the prevalence of hypertension rose from 26% to 36% in women and from 23% to 31% in men between 1998 and 2008, although the observed increase may be due to methodologic differences (8). The national prevalence of diabetes was estimated to be 5.5% in 2000 (9). However, there are indications that this may have increased as well. In 1990 the age-standardized prevalence of diabetes in urban African residents in Cape Town was already 8% (10). This was considerably higher than that reported from elsewhere in sub-Saharan Africa and has risen by ~50% within 18 y (NS Levitt, unpublished data, 2011).

NCD risk factors in the country are common and, as such, they affect large numbers of people. They often differ by sex, show a rural-urban gradient, and, with the exception of cigarette smoking, show little sign of abating. Thus, ~7.7 million people over the age of 15 y smoke (men, 35%; women, 10%); 13 million are physically inactive or insufficiently active (men, 63%; women, 49%); and 13.4 million have a diet low in fruit and vegetables. In addition, 9.1 million people >15 y old are overweight or obese, and rates are almost double in women (54.9%) than in men (29.8%) (6). Of more concern, adolescents already appear to be developing an adverse NCD risk profile. The latest Youth Risk Behavior survey reported that 26% and 15% of boys and girls, respectively, smoke, and 42% of the sexes combined were physically inactive (11).

It is evident that demographic factors play a major role in the NCD epidemic. There is considerable migration from rural to urban areas, particularly among younger adults, which results in the establishment of large informal settlements on the periphery of established cities. This is associated with changes in dietary patterns, lower levels of physical activity, and higher rates of obesity. The stressful living conditions in these settlements may also contribute to the development of NCDs (12). It is likely that aging, too, plays a major role in the NCD epidemic. The proportion of the South African population ≥60 y old [7.3% of the total population in the latest census (2001)] is expected to rise almost 3-fold by 2025 (13), despite the HIV/AIDS epidemic.

Sociocultural factors (eg, the perception of ideal body shape) are also important contributors to the NCD epidemic. Black African women perceive being overweight as desirable, because this signifies beauty, affluence, health, and negative HIV status (14). Even black African adolescent girls commonly perceive fatness as a sign of happiness and wealth, and associate thinness with ill health, especially HIV/AIDS and tuberculosis. Among the burgeoning middle class, and women with higher levels of education, these perceptions are changing. A minority of black
African adolescent girls do hold different views about the advantages of fatness, because of the association of body fatness with diseases such as diabetes and hypertension and with increased difficulty in finding appropriate clothing sizes (15).

HIV EPIDEMIC AND INTERACTION WITH NCDS

Unlike the situation with NCDs, there are encouraging signs that the HIV/AIDS epidemic is abating, both in the region and in South Africa. For example, the number of people newly infected with HIV in sub-Saharan Africa fell from 2.2 million (range: 1.9 million–2.4 million) in 2001 to 1.8 million (range: 1.6 million–2.0 million) in 2009. In South Africa, the annual HIV incidence among 18-y-olds fell from 1.8% in 2005 to 0.8% in 2008, and halved among women aged 15–24 y old (from 5.5% in 2003–2005 to 2.2% in 2005–2008) (1). Initially it was thought that the number of people who would survive to the age at which NCDs would become more common would be significantly lowered by the HIV/AIDS epidemic. Indeed, population growth had fallen substantially and was projected to fall from 1.8% to 1.3% between 1995 and 2010. It was in this context that Levitt and Bradshaw assessed the effect of the HIV epidemic on the burden of diabetes, as a marker condition for the NCDs (16).

The analysis indicated that the number of people with diabetes could be expected to grow between 1995 and 2010, merely as a consequence of the growth and aging of the population, as seen in Figure 3. Thus, the projected total number of people with diabetes would be 1.34 million should the diabetes prevalence remain static over this time period (2.015 million with a 50% rise in prevalence and 2.631 million with a 100% rise in prevalence). Based on the assumption that one-half of this number would be known to have diabetes and be seeking medical care, the patient load would be 677,000, 1.008 million, and 1.316 million, respectively. These estimates were conservative because they were calculated at a time when ART was unavailable; consequently, the potential effect of ART on population growth rates or on the incidence of diabetes was not considered. Because access to ART has increased substantially over the past 4–5 y, mortality rates have fallen and life expectancy has risen. In South Africa, average life expectancy is now 50 y for men and 54 y for women (17). It would thus be important to revisit the earlier analyses, but one would now need to factor in the possible effects that ART per se would have on the incidence of diabetes.

FIGURE 3. Estimated increase in the numbers of people with diabetes from 1995 to 2010 in both the presence and absence of the HIV epidemic, based on assumptions of no increase, a 50% increase, and a 100% increase in age-specific prevalence.

There have been numerous reports from developed countries that ART increases the risk of diabetes, dyslipidemia, and myocardial infarction (18–21). More recently, however, data from developed countries have suggested that HIV infection per se is also associated with increased rates of CVD risk factors, which result in increased risk of myocardial infarction (22, 23). Yet the data on CVD and its risk factors in HIV-infected individuals from sub-Saharan Africa remain sparse. Moreover, cardiovascular risk is likely to differ from that described above. Those infected with HIV in sub-Saharan Africa are predominantly young women who have few conventional risk factors for CVD and are therefore at low risk of cardiovascular events. In South Africa in particular, however, where the background rates of obesity are high among women, even though HIV infection has been reported to reduce BMI (in kg/m²) by ~1.9 units, these women are frequently overweight (24). This picture is likely to become more prevalent elsewhere in the region where the rates of obesity are increasing (25). When ART is started, there is almost invariably a rise in adiposity, as well as a change in the distribution of fat deposition (26, 27). Data are beginning to emerge from various African countries that show a high prevalence of dysglycemia and increased visceral adiposity and dyslipidemia in HIV-infected patients on combination ART (28–31).

HEALTH CARE IMPLICATIONS OF THE COLLIDING EPIDEMICS

The extent of the HIV/AIDS epidemic and the need for increased access to ART has had a profound effect on already stretched health care systems in South Africa and sub-Saharan Africa. The massive up-scaling of ART has resulted in the fact that ~37% (34–40%) of adults and children medically eligible for this therapy in the region received it in 2009, compared with just 2% 7 y earlier (1). The South African Department of Health has the largest ART program internationally; at the end of 2009 55% of adults in need of ART were receiving treatment, but whether the target of 80% coverage of those who need it by 2011 is achievable is uncertain (32).

The unprecedented rollout of ART has been made possible through the injection of large amounts of donor funding. This has resulted in the development of a vertical program characterized by the use of additional and separate staff, registration processes, and newly constructed buildings, separate from where patients access primary health care for other illnesses. With the advent of ART, HIV/AIDS has been transformed into a chronic disease in which patient needs have come to resemble those of patients with traditional NCDs such as diabetes and hypertension. The ART program shows considerable strengths and innovations that could easily be extended to address patient groups that essentially have similar needs for patient-centered long-term care. These innovations, which have included, among others, task shifting to middle-level health providers such as nurses, the engagement of adherence counselors/treatment buddies, and the concept of “treatment literacy,” have resulted in high levels of adherence, initially at research sites and now at primary care clinics in many countries (1, 33). Task shifting through the initiation of nurse-led clinics with the use of an algorithm-based strategy for the management of hypertension, diabetes, asthma, and epilepsy in rural and urban Cameroon has been shown to be an alternative to
physician-led services (34). The nurse-led clinics were associated with an impressive drop in BP [systolic BP by a mean of 11.7 mm Hg between baseline and final visits, and a fall in mean fasting capillary glucose (1.6 mmol/L) in people with diabetes over the same time period (35, 36)]. Such task shifting has not been subjected to a randomized controlled trial for individuals with diabetes and hypertension in the region; however, a randomized controlled trial in the urban clinics of Johannesburg and Cape Town showed that nurse-managed ART was not inferior to doctor-managed ART (33). Furthermore, a recent systematic review concluded that task shifting is an effective strategy for addressing human resource shortages in HIV treatment and care (33).

Most patients in South Africa with NCDs are managed at the primary health care level. In South Africa, as in sub-Saharan Africa, the country’s primary health care systems have traditionally been geared toward the care of acute illness and are ill prepared for the large numbers of people who are seeking care for chronic diseases. Health care at this level is mostly provided by nurses, with support from local medical practitioners when required. Complicated cases can be referred to secondary- or tertiary-level care for consultations with specialists, similar to the situation of patients on ART. Notably, however, support from community health workers for patients with NCDs at the primary care level is rarely available, there is seldom opportunity for patient education, and health workers lack communication skills, which results in suboptimal patient-centered care. In addition, there are “stock outs” of essential drugs, lack of access to other drugs such as statins, budget constraints that prevent health providers from ordering essential tests, lack of recall systems for nonattenders and inadequate patient records (37). Consequently, patients with NCDs who attend primary care services seldom achieve an adequate level of care. For example, a large study conducted in 18 community health centers to assess the quality of care for diabetes and hypertension showed that 67% of patients with hypertension had BP >140/90 mm Hg and 58% of patients with diabetes had nonfasting blood sugar levels >11.1 mmol/L (38). In addition, in a previous study, complications of diabetes were seldom sought, despite their common occurrence (39).

Despite these shortcomings, there have been some notable successes. A diabetic retinopathy screening program that uses a mobile camera has been set up to screen the eyes of diabetic patients, and those shown to have severe retinopathy are referred for sight-saving laser therapy (40). Initiation of a wholly nurse-led clinic in rural Kwazulu Natal, with key elements of education and drug titration by clinical algorithm and with the use of drugs on the essential drug list, led to significant improvements in glycemic control in diabetic patients that were maintained over an 18-mo period [glycated hemoglobin: 11.6 ± 4.5% (SD) at baseline and 7.7 ± 2.0% at 18 mo (41)].

There has been much discussion about the cogent concept of integration of the HIV and tuberculosis programs, given their common coexistence (42). Indeed, successful examples of such integration have been reported (43). Regardless of this, our contention and that of many others is that the current vertical program for HIV/AIDS care and that for NCDs, which take place within a chaotic primary care system, should be replaced by integrated care for patients with any chronic disease, in a coherent patient-centered program, as suggested by the WHO framework for Innovative Care for Chronic Conditions (Figure 4) (44). Integrated chronic disease care services in primary care facilities should be separated from acute care services, naturally with sufficient
coordination between the 2 forms of care to ensure that patients can move freely between acute and chronic care services when required. The WHO Innovative Care for Chronic Conditions model of care places the patients and their families at the center of the pyramid and emphasizes the role of both community partners and the health care team in ensuring that patients are prepared and informed, and motivated to take care of themselves. This model requires health workers to change their style of interaction with patients, such that the patient experiences him- or herself as an active person who participates in the decisions about his or her own treatment. Training in brief motivational interviewing techniques for health care providers has been shown to be effective in changing behavior, such as smoking cessation and bringing about weight loss, but the data on its role in the improvement of chronic disease care are still limited (45–47). The health providers also need to be properly equipped to monitor the adequacy of patients’ chronic disease control, whether it be CD4 count, glycemia, or BP, and to screen for complications, so that appropriate interventions can be instituted.

Chronic disease care requires continuity of care. This has multiple components (ie, continuity of care by a specific group of health providers and continuity of information by means of handheld records or electronic records if available), which should ensure that even in the event of up- and down-referral, there will not be a breakdown in the continuity of information. A register would facilitate patient recall in instances of nonattendance. Comprehensive care is also important, so that the health provider is able to address all aspects of chronic disease care in a single consultation, to take account of the high comorbidity of different chronic diseases. Consistent drug supplies are central to good chronic care, as is the ability to prescribe medication for a reasonable duration to avoid repeat visits of the patients to clinics merely to collect medication. The management of chronic diseases needs regular monitoring and evaluation. This should include regular auditing of the quality of care provided, with feedback to direct interventions that lead to improvements of the care provided, and support for patients with chronic diseases.

The integration of care for people with NCDs and those receiving ART will require considerable thought and planning. Integration may take different forms and may occur at various stages/phases of the patient’s interaction with the health care system. A completely integrated service, whereby the same personnel provide services to both groups of patients within the same facility as part of a combined clinic, would be at one end of the spectrum.

The integration could further extend to the community, and the same community health workers could provide adherence support for both NCDs and ART. This is probably feasible where patient numbers are modest, but not when patient loads are heavy. The initiation of chronic disease clinics for the combined care of HIV/AIDS, diabetes, and hypertension in 2 Cambodian provincial referral hospitals has shown reasonable retention rates at 2 y (48): 70.7% of patients with diabetes (90% of whom who attended for >3 mo) and 87.7% of patients on highly active ART remained in active follow-up. In addition, outcomes for patients on ART were good: the median CD4 count doubled, but only 68% of people who received treatment for hypertension had achieved the target BP of 160/90 mm Hg; no outcome data were available for the people with diabetes. In these clinics all patients were managed in accordance with standard treatment protocols. A team of counselors promoted adherence and lifestyle changes to complement medical consultations, and peer support groups extended the efforts of the doctors and counselors. There was one notable difference, however; ART was provided free of charge, whereas diabetic and hypertensive patients had to purchase their drugs (48).

There is no reason why this cannot be extended to the primary care level. It would facilitate access for patients, reduce stigma (ie, patients would sit in the same waiting room), and, as mentioned earlier, provide a more holistic service by enabling patients with comorbidity to have their NCD and HIV/AIDS care reviewed in one visit. It is current practice for people to attend clinics on multiple days on which they see different health providers for their various combinations of chronic infectious diseases and NCDs. In South Africa, where free primary health care is available in the public health care sector, all drugs are provided free of charge to patients. The same does not hold true in most other African countries, where patients with NCDs have to purchase their own drugs. On the other hand, ART is given free of charge because this is provided by international donors. This matter needs to be addressed, either through the provision of free medication, whether it be ART; drugs for hypertension, diabetes, or other NCDs; or a small copayment for all these conditions, should this be possible.

The way forward is to design pilot projects to be conducted at demonstration sites to concretize the concept of integrated care for patients with NCDs and HIV/AIDS and thus inform policy change. The relevant stakeholders, such as the NCD and HIV program directors, will need to be consulted, for if this step is omitted and their support not obtained, the project will be doomed to failure. The next step would be to conduct a situational analysis of the care for people on ART and NCDs in the selected sites, and, rather than include all the NCDs, select one or 2 (eg, diabetes and/or hypertension) as marker conditions for the NCDs. On the demand side, there will need to be an assessment of the numbers of patients who attend per day for HIV/AIDS care, those who attend for diabetes or hypertension care, and those with comorbid HIV/AIDS and diabetes or hypertension who attend separate clinic facilities, as well as the patient flow. In addition, patient attitudes to combined clinics will need to be explored through focus groups, and ways to minimize fears and stigma investigated. On the supply side the investigation would need to assess numbers, levels, current roles, and responsibilities of the health care workers, the availability of laboratory testing, and the supply of medication and testing materials. This information could be gathered by interviews with selected staff members with the use of a specific questionnaire, in addition to direct observation, and so too could the processes for registration; tracking of nonattenders; collection of routine clinical data for audit purposes; and examination of the support tools for the health workers, such as guidelines and equipment. In-depth interviews with health workers and management will be critical because, in general, health providers are unenthusiastic about doing more work, particularly without reward. If, however, they are actively engaged in the reconfiguration of a service and can see clear benefits to the care provided, the situation is quite different.

The identification of a “champion” among the health workers for the pilot work is likely to be key. In addition, the development of support tools and training of the health workers in their use, the provision of the requisite clinical equipment to serve patients with
a wider range of conditions than previously, and the institution of monitoring and evaluation processes will need to be in place before the model of integration can be tested. Initially, integration could be limited to those people with comorbid NCDs and HIV, because the numbers may not be excessive. Subsequent expansion could take place by streaming in patients with an NCD in a prior HIV clinic or vice versa, with the numbers agreed on by the staff. Evaluation would need to include an assessment of both processes (eg, examination for complications of diabetes) and short-term outcomes (eg, CD4 counts, levels of BP and glycemic control, adherence to clinic appointments and medication) so that negative effects of the process of integration could be identified. Ascertainment of patient and staff levels of satisfaction and experience with the integrated service and eliciting the respective groups’ suggestions as to how to improve the process will be critical. Whereas it is anticipated that integration may reduce costs through a diminution of duplication of services, the pilot projects will have to be costed to ensure optimal use of limited resources.

This proposal is not limited to low-resource settings. Indeed, it could apply equally to high-resource settings, where NCDs traditionally fall within the realm of primary care, whereas care for people on ART is frequently provided through specialized services.

The idea of combining traditional NCD care and the care of patients with HIV/AIDS on ART while separating it from traditional acute care services will be new for many policy makers. It will challenge the traditional wisdom of what the structure of health services should be. However, the extensive funding that has been made available for HIV/AIDS care in sub-Saharan Africa has allowed the development of new models of care for patients with a chronic condition. The time has come to combine the care of patients with HIV/AIDS with that of patients with NCDs. This will permit the optimal utilization of human and other resources in settings in which these are in short supply, for the benefit of the people with these diseases.

The authors’ responsibilities were as follows—NSL: conceptualization of and drafting of the initial manuscript. KS, JD, and DB: drafting of the manuscript. NSL, KS, JD, and DB: reading and approval of the final manuscript. None of the authors reported a conflict of interest.

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