

EDITORIAL

Poverty, TB, and HIV Infection: A Vicious Cycle

The two papers that have been published in this issue—one by Booyesen *et al.* (1) and the other by Kennedy *et al.* (2)—represent a clear indication of the vicious cycle of events that exists in Africa involving poverty, tuberculosis (TB), and HIV infection. The South African study by Booyesen *et al.* used data from the South African Demographic and Health Survey to try and relate poverty and knowledge about HIV/AIDS and risky sexual behaviour as surrogates of vulnerability to HIV infection. However, the authors show only marginal associations that led them to admitting that such cross-sectional studies have limitations in collecting information about sexual behaviour, since the crude nature of the questions asked could not allow in-depth assessment of knowledge or behaviour. Furthermore, studies of this nature may not show how knowledge gained through disease-prevention programmes can be translated into practice. The authors, therefore, urge for more sound study designs to further elucidate what their paper has attempted to address.

The findings of the Zambian study by Kennedy *et al.* add to the wealth of literature on the association between HIV infection and TB. The study takes advantage of an ongoing follow-up study on HIV-discordance among heterosexual couples and its association with TB. The findings indicated higher morbidity and mortality due to TB among participants with HIV-associated TB compared to HIV-negative ones with a diagnosis of presumptive TB. They rightly recommend further research into the area as there are still many unanswered questions about the association between the two diseases and what may affect their magnitude and spread. Questions, such as what may make couples to become HIV-discordant and remain so

without prevention, how HIV-discordance may be related to TB-discordance among couples, and what may be the specific role of HIV-discordance on TB, are some of the relevant ones for their study on HIV-discordant couples.

Although the two papers do not articulate the different facets of poverty, TB, and HIV infection, they join others in attempts to find means and ways to address the vicious cycle created by the triad. The United Nation's Millennium Development Goals (MDGs) were declared in 2000 to address poverty and its links. The eight MDGs were formulated in such a way that any achievements in the specific targets would have a significant impact on the vicious cycle, thereby affording opportunities for researchers, programme managers, policy-makers, politicians, and donors to contribute. The UNAIDS predicts that the AIDS pandemic is likely to cause devastating effects in most areas of the world, if efforts are not scaled up to combat it. At present, countries of the sub-Saharan Africa are facing the highest rates of HIV prevalence in the world, and serious social and economic effects are already being experienced. Moreover, in the southern region of Africa, where the two studies were conducted, the countries are facing the highest rates of HIV prevalence.

Among the health improvements that were observed in some developing countries, particularly during the 1980s, were related to control of TB. These included the reduction in the number of TB cases as well as new infections. The reduction was brought about by successful national TB control programmes (3,4). However, in Africa, these achievements are being undermined by the emergence of the AIDS epidemic. Despite the availability of effective vaccine and chemotherapy, the region experiences a heavy death toll due to TB every year. In addition to this human cost, TB also represents a significant economic burden for these countries.

Compared to HIV/AIDS, TB is an older disease. Tuberculosis has variously been associated with poverty, over-crowding, migration, and poorly-managed TB case-finding and treatment programmes. More recently,

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increasing trends have been observed in many countries, especially in Africa where the HIV/AIDS epidemic has had the worst impact (5-8). Both HIV and TB affect poor populations more than they affect the rich. In addition, TB affects those with suppressed immune responses more than it affects those without such problems. HIV, therefore, creates a favourable environment for the spread of TB, particularly in individuals who are already infected with TB but have not developed the disease, thereby increasing susceptibility to TB and contributing to the rising incidence in the affected countries. Moreover, TB may behave differently depending on the status of HIV infection. TB in HIV-positive individuals may present atypically with a lower probability of sputum positivity, greater difficulty of diagnosis, and more rapid clinical deterioration than TB in HIV-negative individuals (9).

On the public-health standpoint, both TB and HIV are also common in impoverished urban and rural societies where conditions are favourable. Coupled with the emergence of multidrug-resistant strains of *Mycobacterium tuberculosis* (10), particularly in patients infected with HIV, this situation is most likely to lead to widespread transmission of TB, increasing prevalence of TB disease, and mortality due to TB. This is what led the World Health Organization to declare a global emergency for TB in April 1993 (11,12) and the ministers' conference in Amsterdam in 2000 to designate 24 March of each year as 'World TB Day' (13). Other important commemorations are the 'World AIDS Day' of UNAIDS and "Poverty Eradication Decade of 1997-2006" of the United Nations which, together with others, should provide opportunities for tapping political commitments from countries as well as donors to break the vicious cycle in the triad. It is in the same context that the global emergency of TB during a time when cheap and effective anti-TB drugs are available has been described as a paradox that should now be addressed through societal and political means (14).

Results of various studies have confirmed the association between TB and HIV. The studies range from those utilizing aggregate data to those using individual-level data (15-19), but new public-health challenges are being faced by programme heads and policy-makers as they increasingly find it difficult to deal with emerging complex situations of having to include yet new health problems in their programmes without having additional resources (20). The result is that programme managers are forced to run programmes that cannot address critical

health problems sufficiently, which, in turn, leads to poor quality of services, increased morbidity, and worsening economy.

The relationship between poverty and HIV or poverty and TB is not new (19, 21-24). Poor people are vulnerable to these infections due to the nature of their living conditions. On the other hand, once individuals succumb to these infections, they easily become poor since they are not able to become economically productive—and the vicious cycle of the triad persists. Many studies have shown that economic inequalities between the poor and the rich, and between the north and the south, have a major role in health inequalities (25,26). The South African study in this issue of JHPN is an eye-opener into operational studies on how to reach the poor more effectively, given that at present, effective interventions are available and that techniques are in place to quantify poverty in ways that can be standardized for use in different settings. From the references cited in this paper, it is evident that the authors are familiar with these techniques.

The Zambian study reports the first evidence on the outcomes of TB among heterosexual discordant couples. However, the limitations they reported may have been related to the reported diagnostic handicap that led them to using a set of indicators instead, with their limited validity. Since the study is part of an ongoing project that recruits HIV-discordant couples, it should continue to be exploited using innovative designs to study the transmission of TB and socioeconomic characteristics of the couples while ensuring that ethical principles are not violated. It is further suggested that the Zambian study should analyze the data while keeping the couples together to assess the influence of discordance on the incidence of TB. This is because HIV-discordant heterosexual couples are usually in very close contact with each other, and once one member develops TB disease, the other is at high risk of developing the disease as well, particularly if the latter is HIV-positive. Such analysis would then provide information about the incidence of TB among HIV-discordant couples and about dynamics of transmission of TB between partners when one of them develops TB disease. If the study is well-designed, backed by good record-keeping in facilities and in case-finding activities, it should also be possible to study the origin of the TB disease (whether endogenous or exogenous) and its incidence in the different couple-combinations and the varying status of HIV infection among them.

Despite unavailability of vaccines and lack of definitive treatment for HIV, currently-available methods of prevention to adopt safe sex are potentially effective but have failed their advocates for either being inaccessible, unattractive, inconvenient or unacceptable to a significant majority of the target population. Anti-retroviral drug treatment has only helped the few who can afford to obtain it, while multinational drug companies have reaped their share and continue to do so from those poor countries that have the highest rates of HIV infection and incidence of TB, thereby maintaining the vicious cycle. This pecuniary interest on the part of the multinational companies has led them to become disinterested to invest in the very potential area of vaccine development. This situation calls for concerted and renewed efforts to reconsider prevention, particularly vaccine development for HIV as a top priority, if we are to get rid of HIV in similar ways as we did for small pox. The 'Global Fund to Fight AIDS, Tuberculosis and Malaria' was created to increase resources to address these problems through correction of structural inequalities (27-31) and should be used for this purpose.

In conclusion, the two studies should provide renewed impetus for more rigorous study designs to fill the knowledge gap that is preventing the development of more effective preventive strategies against HIV, including vaccines, whose development has so far not progressed fast enough to match the available technological advances. Furthermore, since chemotherapy appears to be the most powerful tool in the fight against TB, research in TB chemotherapy, especially against multidrug-resistant TB, as well as operational research into distribution and administration of available effective therapies will take us far in combating the disease. All these efforts must ensure that preventive and curative interventions are equitable and reach all segments of the target population. This could be the best and only rational way to address the poverty, TB and HIV infection cycle in the near future. The key to reduction in the incidence of both the diseases is the improvement of socioeconomic conditions, improved diagnosis, case-finding and treatment, all of which depend on societal and political factors that are responsible for inequities in health, wealth, and justice.

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