Impact of family structure on HIV infection in 20 countries in Sub-Saharan Africa: a multivariate analysis approach

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Submitted: December 2009

Abstract

This proposal focuses on the role of family structure as one group of causes of the HIV/AIDS epidemic in Sub-Saharan Africa. This will be done by making comparisons among countries with varying HIV infection rates. Data are used from Demographic and Health Surveys (DHS) conducted in 20 countries in Africa among men and women aged 15-49 years old between 2002 and 2008. Both bivariate and multivariate techniques of analysis will be used. Attention is also paid to the interrelationships between family structure and other demographic, social and economic factors. This is facilitated by using a model in which the various factors are classified into three groups: proximate, intermediate, and underlying or distal. In our project we will focus initially on the impact of variables at the proximate and intermediate levels. There is evidence of substantial differences, at the level of proximate factors, in high-risk sexual and other behaviour between countries with high HIV prevalence and countries with low HIV prevalence. This difference is – at the intermediate level - partly due to the characteristics and functioning of the family system (married couples and partners living together) and informal sexual unions (premarital and extramarital sex). Settled family situations are less prevalent in countries with high HIV prevalence than in countries with low HIV prevalence. Informal unions are, on the other hand, more common in countries with high HIV prevalence than in countries with low HIV prevalence. Conclusions are drawn at the end concerning the importance of the variables to be included in the multivariate analysis. The role of variables dealing with family structure in particular is emphasized. We also focus on the implications of the findings for development of HIV/AIDS strategies and policies in countries with high and low HIV prevalence.

Introduction

It has long been recognized that social, demographic and economic factors are important determinants of the HIV/AIDS epidemic (e.g., Caldwell et al., 1989; UNAIDS, 2008; Barnett & Whiteside, 2002). In our project attention the focus of attention will be on the impact of family structure. An appropriate way to find out more about the impact of family structure is to make a comparative study of countries in Sub-Saharan Africa with different levels of HIV infection. Data on prevalence of HIV infection and factors influencing HIV infection have recently become available from a number of Demographic and Health Surveys (DHS) that have been conducted in 20 African countries between 2002 and 2008 (Mishra et al., 2009). Some of the countries included had very high levels of HIV infection (more than 12% of adults aged 15-49), others had medium levels (between 2 and 12%) and still others had very low levels (below 2%).

Theoretical framework

This project will not only focus on the relevance of family structure in African countries, but also on the interrelations with other social and economic factors. This will be facilitated using a model which describes the various causes and their interrelationships (Figure 1, not included here). This model has similarities to the one designed by Barnett and Whiteside (2002), but with several modifications. It focuses on heterosexual transmission and has the following groups of causal factors: proximate, intermediate, and underlying or

distal. Each of these groups will be discussed in turn. The dependent variable of the model is HIV infection.

The model contains two groups of proximate variables. First is Sexual Behaviour: age at sexual début, sex in marriage and in informal unions, type of informal unions (premarital and extramarital), type of sex, number of partners (serial, concurrent), commercial, transactional and non-commercial sex, and the use of condoms. The second group of variables comprises various transmission and other factors: virus subtype, gender, age, male circumcision, presence of other Sexually Transmitted Infections (STIs), education and income.

There are two groups of intermediate factors: the first deals with aspects of family system (system of formal sexual unions). It refers to characteristics of and processes taking place in the family: marital status, type of partnership (marriage, cohabitation and polygyny), family composition (e.g. with or without partner and with or without child or children), cohesion between partners, type of family (nuclear vs. extended family), type of household (male of female headed). The second group of factors deals with informal sexual unions: premarital and extramarital sexual relations, types of commercial or transactional and non-commercial sex. The influence of intermediate factors can be either direct or can work through the proximate factors.

The underlying or distal factors refer to characteristics and processes taking place in the political and economic systems (country level): per capita income, economic equality/inequality, labour migration. Also included here is a group

of factors called other national characteristics. They are characteristics of countries such as their composition by, for instance age, sex, ethnic group, educational attainment and religious affiliation. The impact of the underlying factors on HIV infection can be direct or can work through the intermediate factors.

The framework described above is a selection of all factors with an influence on HIV infection rates. Factors operating at the community level (characteristics and processes) in places such as neighbourhoods, towns, cities, schools, religious organizations, industrial enterprises were excluded. Ethnicity is another factor belonging to this group.

The aim of our project is to determine the impact of features of the family system – the intermediate level - on HIV infection in a number of Sub-Saharan countries. This cannot be done without considering the role of social and other variables operating at the proximate and underlying levels. In our project we will, however, focus on the role of proximate and intermediate variables only.

Data and methods

The data come from Demographic and Health Surveys carried out in 20 countries in Africa between 2002 and 2008. Sample sizes were usually between 4,000-7,000 for men and women separately. Data were collected on a wide range of topics such as on fertility, fertility preferences, use of contraception, below-five mortality. In addition, information was also gathered on demographic, social, economic and other factors with a possible influence

on HIV status. Data on HIV status were obtained from blood samples collected from both male and female respondents between 15 and 49 years old.

Both bivariate and multivariate methods of analysis are and will be used. For multivariate analysis we plan to use hierarchical logistic regression analysis to determine the impact of variables at two levels namely individual and family. The variables in these two groups correspond with the proximate and intermediate factors identified in the theoretical framework described above. A hypothesis to be tested here is that the percentage of the variance explained (R square) will increase considerably by addition of the family-level variables to the individual-level variables. Techniques of multilevel logistic regression analysis may be used at a later phase in the implementation of the project (Snijders and Bosker, 1999).

Next, we will report on the key variables that will be included in the bivariate and multivariate methods of analysis. Their relevance is determined by making comparisons of countries with high HIV prevalence (12% or more of adults 15-49 years old) with countries with low HIV prevalence (2% or less). If there are large differences in values for these variables between the two types of countries, it is likely that they are important as determinants of HIV infection.

Results.

Proximate factors.

It was possible to provide data on Sub-Saharan countries on six proximate variables with a known impact on prevalence of HIV.

The first and the second variables deal with prevalence of premarital and extramarital sex (Table 1, not shown here). The percentage of men 15-24 years old who had premarital sex in last year was much higher in high-prevalence HIV countries than in low-prevalence HIV countries (e.g., 31.8% in Swaziland compared to 20.9% in Senegal) (in 2004). The percentage of men in the age group 15-49 years old who had had extramarital sex in the past 12 months was 58.2% in Swaziland and 42.7% in Senegal.

The third and fourth variables deal with the use of condoms (Table 2, not shown here). The percentage of men in the age group 15-24 using condoms during last premarital sexual intercourse is higher in high-prevalence HIV than in low-prevalence HIV countries (e.g., 69.5% in Swaziland versus 47.5% in Senegal. Differences between both types of countries also exist in condom use by men 15-49 years old during last extramarital sexual intercourse (e.g., 67.3% in Swaziland vs. 61.9% in Senegal).

Comparisons of prevalence of STIs other than HIV/AIDS showed much higher levels in countries with high HIV prevalence than in countries with low HIV prevalence for both women and men (Table 3, not shown here). It should be added here that the data on STIs are based on reports provided by the respondents themselves (self-reported).

The percentage of circumcised men 15-54 years old in was higher in countries with a low prevalence of HIV infection than in countries with a high HIV prevalence (Table 4, not shown here) (e.g., 8.1% in Swaziland versus close to 100% in Senegal).

The data presented above show in general substantial differences in high-risk behaviour between countries with a high HIV prevalence than in countries with a low HIV prevalence. An exception was the use of condoms by unmarried and married men in high and low HIV prevalence countries.

Intermediate factors.

The first of three factors considered is marital status. Table 5 (not shown here) shows that the percentage of men and women 40-49 years old who had not married was much higher in high HIV prevalence countries than in low HIV prevalence countries (e.g., for women 10.6% in Swaziland versus 0.7% in Senegal). The married state was also less common for both men and women 40-49 years old in high HIV prevalence than in low HIV prevalence countries. About 9.4% of respondents in Swaziland (an average of men and women) lived together without formally being married, an arrangement that is uncommon in Senegal (0.6%). Even when the married and cohabiting states are added together, they are less prevalent in Swaziland than in Senegal (e.g., for women 64.4% and 88.2% respectively).

A second factor concerns the difference in years between the median age at sexual début and at marriage (Table 6, not shown here). This difference is

higher in high HIV prevalence countries than in low HIV prevalence countries. For example, data from Swaziland show for men a difference of about 8 years between median age at first sexual intercourse and marriage (19.5-27.7) and for women 6 years (18-24.3). This is in contrast with Senegal where there is for men a difference for men of about 7 years (20.9.-28.1) between sexual debut and marriage and hardly any difference for women (18.7 years for age at sexual debut and 18.5 years for age at first marriage). This means that with respect to Senegal there is a large difference between men and women: men became sexually active somewhat later and married much later.

A third difference between both countries deals with the prevalence of single-headed households (see Table 7, not shown here). In high HIV prevalence countries there is a higher percentage of families headed by women than in low HIV prevalence countries (e.g., 52.1% of households in Swaziland were headed by men (usually with a spouse present) and 47.9% by women (usually without a husband). This is in sharp contrast with Senegal where the percentages were 76.9 and 23.1 respectively.

The data presented above reveal substantial differences in features and functioning of formal and informal sexual union systems in both types of countries.

Another difference between the two types of countries is that births outside marriage are common in countries with high HIV prevalence and rare in countries with low HIV prevalence (details not yet ready).

Underlying factors.

(Not considered in this phase of the project)

Discussion and Conclusions

First, we described a theoretical framework that contains key variables to be included as determinants of HIV infection in Sub-Saharan Africa. Next, comparisons were made for a number of variables at the proximate and intermediate levels in countries with high versus low HIV prevalence. These comparisons suggest in general that the variables that were selected are indeed important as determinants. These variables should, therefore, be included in the bivariate and multivariate analysis which is in the process of being carried out.

The comparisons suggest that the various social, cultural, political and economic factors, exercising their influence at each of the two levels of our model, partly explain why the HIV/AIDS epidemic became much more severe in countries with high HIV prevalence than in countries with low prevalence of HIV infection. At the level of proximate factors, the study found considerable differences in high-risk behaviour and vulnerability to HIV/AIDS between both types of countries. This finding is in general in accordance with the results of various studies looking at the impact of several proximate variables on HIV infection in a number of countries (bivariate analysis) (e.g., Mishra et al, 2009).

These results imply that in low HIV prevalence countries health education and other programmes aiming to change high-risk sexual behaviour, to increase the use of condoms and to decrease prevalence of STIs are indispensable. They are needed in order to prevent HIV epidemics from taking off in these countries. Such programmes continue, of course, to be necessary for high HIV prevalence countries.

Much of this difference in vulnerability is in high HIV prevalence countries– at the level of intermediate factors – the consequence of existence of a mixture of two systems of formal and informal sexual unions (Therborn, 2004). There is also a considerable group of adults with no permanent relationship and a substantial number of incomplete families headed by women. Moreover, there is relatively low cohesion in the husband-wife relationship due to long periods of when spouses are physically separated. This is in contrast with low HIV prevalence countries, where there is nearly universal marriage with more husbands at home most of the time.

A key hypothesis in our project is that this high-risk behaviour in high HIV prevalence countries was influenced by the prevalent stresses and strains in the existing family system. This is supported by results of a various studies conducted in a number of countries in which marital status turned out to be an important determinant of HIV infection (bivariate analysis) (e.g., Mishra et al., 2009).

An implication of these findings is that in countries with high HIV prevalence it is necessary to implement measures and programmes that strengthen the

existing family system. In order to reverse the epidemic, efforts have to be made, therefore, to increase the number of stable families and partnerships with strong cohesion among the partners, with equality between them and with both of them physically present most of the time. Policies and programmes decreasing gender inequality will help by strengthening the position of women in households and protecting them against abuse.

With respect to countries with low HIV prevalence, it was mentioned that its family system is characterized by nearly universal marriage and a pervasive influence on the married couple by the extended family. As long as this system keeps functioning the way it does now, it is unlikely that an HIV/AIDS epidemic (based on heterosexual transmission) will take off. The practice of informal unions (extramarital sex) is gaining ground, however, and this, in combination with low use of condoms, increases the possibility that an HIV/AIDS epidemic will occur. The median age of first sexual intercourse of men continues to be fairly high in these countries, but is likely to decline in the future. Levels of premarital and extramarital sex are still low compared to countries with high HIV prevalence, but this may also change (Carael, et al, 1994; Wellings et al., 2006).

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