

The changing sexual behaviour and attitudes regarding condom use in the era of HIV/AIDS in rural Malawi: A longitudinal assessment

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Introduction

According to estimates by the United Nations AIDS agency (UNAIDS), sub-Saharan Africa remains the region with the highest HIV prevalence compared to other regions of the world. As of 2005, prevalence among adults aged 15-49 years was about three times higher in the region (6%) than in the Caribbean (2%), the region with the second highest prevalence in that year (UNAIDS 2006). Whereas dissension exists (e.g. Potterat et al. 2004), it is widely agreed that heterosexual contact remains the most predominant mode of HIV transmission in the region (Caldwell 2000; Caraël and Holmes 2001; UNAIDS 2006). But does this imply that the sexual behaviour of men and women from this part of the world are different from those from elsewhere? While sexuality and associated behaviours are often influenced by their particular socio-cultural contexts (Hirsch et al. 2002), such a question edges dangerously close to suggestions that individuals from the region are hyper-sexual.

The answer to the above question is therefore, perhaps, that in some ways the patterns of sexual behaviour in the region are no different from elsewhere. There is, for instance, evidence that men and women from the region report almost similar numbers of life-time sexual partners as those from elsewhere such as Asia (Kumarasamy 2004). In other ways, however, the patterns may be distinct. For example, the long-term multiple and concurrent sexual partnerships coupled with lack of condom use within such relationships are some of the suggested factors responsible for the faster spread of the HIV/AIDS epidemic in the region compared to other regions (Morris and Kretzschmar

1997; Caldwell 2000; Meekers et al. 2003; Kumarasamy 2004). In addition, differing levels of male circumcision is the other suggested factor that determines the differential spread of the epidemic in the region (Caldwell 2000; Auvert et al. 2001a; 2001b), as male circumcision has been found to substantially reduce the risk of HIV acquisition among men (Bailey et al. 2007; Gray et al. 2007).

Available evidence indicates that there has been sexual behaviour change in parts of sub-Saharan Africa in response to the HIV/AIDS epidemic. Some of the changes include delayed sexual debut, increased use of condoms with sexual partners who are considered to be risky, reducing the number of sexual partners, and divorcing an unfaithful spouse (Gregson et al. 1998; 2006; Adetunji and Meekers 2001; Stoneburner and Low-Beer 2004; Watkins 2004; Reniers 2005; Smith and Watkins 2005; Hallett et al. 2006). Part of this evidence is based on the *retrospective change method* (Stone et al. 1999) of measuring sexual behaviour change that involves asking respondents about whether and how they have modified their sexual behaviour in the recent past. The other part (e.g. Mbulaiteye et al. 2002; Stoneburner and Low-Beer 2004; Hallett et al. 2006) is based on inferences from trends in HIV prevalence and incidence with declining prevalence and incidence being interpreted to mean sexual behaviour change in response to the epidemic. Yet there is a third method-- the *longitudinal or panel approach*-- that has rarely been used to assess behaviour change in the region, perhaps, because of lack of relevant data. This approach involves asking individuals about their sexual behaviour at different time-points and comparing the responses (Stone et al. 1999).

In this paper, we use longitudinal data collected from rural Malawi (in 2004 and 2006) and the third approach of measuring behaviour change to examine changes in

sexual behaviour and in attitudes toward condom use within marriage over time. We specifically examine whether there have been changes in: (i) sexual partnerships in the twelve months prior to the survey wave, (ii) condom use among those who were sexually active in the past year preceding the survey wave, and (iii) attitude toward condom use within marriage. We also examine the factors that might be associated with the changes, if any, in these aspects of sexual behaviour. We focus on the indirect indicators of the evolution of the HIV/AIDS epidemic, particularly the number of deaths in the household in the recent past and the number of funerals the individual attended in the one month prior to the survey round. We refer to them as indirect indicators because neither all deaths in the household nor all funerals attended could be attributable to HIV/AIDS.¹ However, the implications of the epidemic in Malawi as elsewhere in the region include increased rates of severe illness and prime-age adult mortality (Ngom and Clark 2003; Doctor and Weinreb 2003, 2005). This might therefore be relevant for behaviour change because qualitative accounts from the study settings (Watkins 2004) show that witnessing AIDS-related deaths elicits emotions that might provide the motivation for such change.

Study context

Data from the nationally representative 2000-2004 Malawi Demographic and Health Surveys (MDHS) show that the median age at first sex remained fairly stable over the period for both men and women. Nonetheless, initiation of first sex occurred at younger ages for women than for men in both years. For instance, the median age at first sex for women aged 20-49 years in 2000 and 2004 was 16.9 years and 17.3 years respectively while the corresponding figures for men aged 20-54 years were 18.3 years and 18.5 years

¹ Malaria, for instance, is one of the number one killer diseases in sub-Saharan Africa accounting for close to 20% of deaths among children under five years of age in the region (WHO and UNICEF 2005).

(National Statistics Office [NSO] and ORC Macro 2001; 2005). Despite the stable median age at first sex among adults aged 20 years and above, there was a decline in the proportion of young people aged 15-19 years who initiated sex before age 15 between 2000 and 2004 (from 17% to 14% and 29% to 18% for young women and men respectively). A similar pattern was observed among those aged 18-19 years who initiated sex before age 18 (from 67% to 62% and 68% to 60% for women and men respectively) (NSO and ORC Macro 2005).²

Other qualitative and quantitative evidence from rural Malawi show that individuals are worried about being infected with HIV from either their spouses in the case of married women or their extra marital partners in the case of married men (e.g. Watkins 2004; Smith and Watkins 2005). These studies suggest that in response to such risk perceptions, Malawian men and women may be adopting a number of preventive strategies, such as talking to one's spouse about the importance of avoiding infection, divorcing an unfaithful spouse, reducing the number of sexual partners, carefully selecting partners, and using condoms with "risky" sexual partners (Watkins 2004; Smith and Watkins 2005; Reniers 2006). In the context of the present study and to the extent that the level of worry about being infected with HIV provides the motivation for behaviour change, we should expect: (i) reduced chances of reporting multiple sexual partners, and (ii) increased condom use over time. Increased condom use might most likely be the case in partnerships outside of marriage that are considered casual since current evidence suggests disapproval of condom use within marital and other stable unions (e.g. Bauni and Jarabi 2003; Smith 2004; Chimbiri 2007; Tavory and Swidler

² Throughout sub-Saharan Africa, age at first marriage for women has been increasing while age at first sex remains largely unchanged, indicating that the sexual debut of young women is now more likely to occur outside of, and prior to, marriage (Mensch et al. 2006).

2007). Nonetheless, there is also evidence (e.g. Maharaj and Cleland 2004) to the effect that perceived risk of HIV infection from the partner is associated with increased condom use within marital and cohabiting partnerships.³

Trends in condom use in Malawi, however, point to the possibility of use in pre- or extra-marital partnerships. Figures 1a-b (from the MDHS) show the percentage of currently married and sexually active unmarried men and women who reported ever and current use of condoms in the period 1992-2004. Several observations can be made from the figures. First, the percentage reporting ever use of condoms among currently married men and women is considerably higher than the percentage reporting current use in all the survey years. Second, among currently married men, the percentage reporting ever use of condoms has been rising steadily over the years while the level of current use has remained virtually unchanged. For currently married women on the other hand, both ever and current use has remained unchanged over the years. Third, the percentage reporting ever and current use of condoms among sexually active unmarried men and women is consistently higher than similar percentages among currently married individuals. These patterns are consistent with the view that much of prior use of condoms in Malawi might have occurred outside of marriage either with pre- or extra-marital partners.

<Figure 1 about here>

As already noted, available evidence suggests that condom use within marital and stable unions in Malawi (as elsewhere in sub-Saharan Africa) continue to be perceived as infringements upon trust and love in such relationships. But condoms are increasingly

³ Some research and policy reports also suggest that promoting condom use within marriage is a neglected HIV intervention strategy (e.g. Ali et al. 2004).

becoming available and this may affect people's attitudes toward use within marriage.⁴ Attitudes toward condom use within marriage might also be affected by the increasing availability of testing and counselling services for HIV. Furthermore, since perceived risk of HIV infection from the partner has been found to be associated with increased condom use within marital and stable unions (Maharaj and Cleland 2004), such risk perception might also lead to favourable attitude toward condom use within marriage. But the association between risk perception and changes in attitude might be spurious given the attitude-behaviour problem. Specifically, it might not be straightforward whether it is the attitude that led to changes in behaviour or vice-versa with risk perception being a third variable influencing either of them at the same time. Whatever the reasons, we should expect some changes in attitudes toward condom use within marriage in rural Malawi over time.

Data and methods

Data

The data for this paper come from a longitudinal study, the Malawi Diffusion and Ideational Change Project (MDICP), conducted in three rural sites in Malawi i.e. Balaka in the Southern region, Mchinji in the Central region, and Rumphi in the Northern region (throughout this paper, these sites are referred to as the South, Centre, and North respectively). There have been four rounds of data collection i.e. 1998, 2001, 2004, and 2006. The project initially involved survey interviews with about 1,500 ever married women aged 15-49 years and their husbands (Watkins et al. 2003). However, a new

⁴ Estimates by Population Services International (2005) show rising condom sales in Malawi-- an indication that condoms are increasingly becoming available. For instance, whereas just under 1 million condoms were sold throughout the country in 1994, condom sales reached 6 million in 2001 and 9 million in 2005.

sample of about 1,000 adolescents aged 15-24 years was added to the survey in 2004 while in 2006, the spouses of married adolescents were also included. As in 2001, new spouses to adults already in the sample were included in the 2004-06 waves as well.

This paper uses data from the last two waves when individuals were asked detailed questions about their sexual activity in the past one year before the survey round. Specifically, for individuals who were sexually active in the twelve months preceding the survey, detailed questions were asked for up to three sexual partners (including the current spouse for those who were married) about their relationship to the partner and whether they used a condom with the particular partner. In addition, individuals were asked whether they thought it was acceptable to use a condom with a spouse to protect against HIV/AIDS. Those who thought it was unacceptable or who did not know were further asked about the acceptability of using a condom if the individual suspected or knew that the spouse was infected with HIV/AIDS. These questions allow us to conduct a longitudinal assessment of whether there have been changes in sexual activity and condom use as well as in attitudes toward the use of condoms within marriage in rural Malawi.

Table 1 presents the distribution of the 2004-06 MDICP sample sizes, the percentage of individuals who were interviewed in both surveys as well as attrition status (the proportion of sample members who were interviewed in the previous but not current wave). It shows that mobility (temporary absence and out-migration) was the major source of attrition in both waves. Previous analyses of attrition in the MDICP (Bignami-Van Assche et al. 2003; Anglewicz et al. 2007) have shown results similar to those of studies in other parts of the developing world (e.g. Thomas et al. 2001; Alderman et al.

2003), that is, that while attrition appeared to be selective, the bias in the estimated socio-economic relations due to attrition tended to be small. Table 2, on the other hand, shows the percent distribution of individuals who were interviewed in either survey by selected background characteristics. It shows that the respondents were mostly young (aged 15-24 years), had primary level education, and were currently married at the time of the survey while the distribution of respondents across study sites was similar in both waves.

<Tables 1 and 2 about here>

Methods

In the first part of the analysis, we compare the percent distribution of individuals in the 2004 and 2006 survey waves by sexual partnerships in the 12 months preceding the survey wave, condom use with any partner and within marital relationships over the same period, and by attitudes toward condom use within marriage. We subsequently test whether the between-wave differences in the distributions are statistically significant. This is done separately for each study site and for all the sites combined to examine if there were site-specific differences in the observed patterns. Since the three study sites represent three districts with different socio-economic and cultural patterns (Watkins et al. 2003; Helleringer and Kohler 2005), these differences could be reflected in the changes in sexual behaviour and in attitudes toward condom use within marriage. Our data, for instance, show that nearly 30% of the respondents from the North had attained at least secondary education while the corresponding figures for the South and Centre are much lower (4% and 9% respectively). Furthermore, the South is predominantly characterized by matrilineal and matrilocal marriage patterns, the North by patrilineal and patrilocal patterns, and the Centre by a mixture of both (Zulu and Chepng'eno 2003;

Chimbiri 2007). These patterns might have different implications for sexual behaviour and attitudes toward condom use in marriage.

The second part of the analysis involves the estimation of fixed-effects models to explore whether changes in the indirect indicators of the evolution of the HIV/AIDS epidemic were associated with changes in sexual partnerships and condom use among the study participants. The indicators include: (i) *the number of deaths in the household* in the three to five years preceding the survey round (ranging from 0 to 8 in 2004 and 0 to 7 in 2006); and (ii) *the number of funerals attended in the one month prior to the survey wave* (with a median value of 3 in both waves). The fixed-effects procedure is attractive in this context for a number of reasons. Since our aim is to examine changes over time, the procedure enables us to examine factors explaining the within-individual variations in the outcome of interest (Petersen 2004). It therefore allows us to estimate the effects of the measured time-varying factors on sexual partnerships and condom use over time and at the same time to control for all the measured and unmeasured time-invariant characteristics. It further relaxes the assumption of the random-effects procedure that the unmeasured characteristics are uncorrelated with the measured variables (Petersen 2004). The procedure's major drawback is that we can only measure the effects of characteristics that vary over time. Related to this limitation is the fact that individuals with no changes between waves in the values of the dependent variable do not contribute to the estimation. But these should not pose a problem to the present study because our focus is on changes over time and on the time-varying indicators of the evolution of the HIV/AIDS epidemic in the study settings. We also present the results from the random-effects models for comparison with those from the fixed-effects models.

We have three dichotomous dependent variables. The first is *multiple sexual partnerships* in the past 12 months prior to the survey wave which is coded 1 if an individual reported two or more sexual partners and 0 otherwise. The second is *condom use* with a particular sexual partner over the same period and is coded 1 if condom was used and 0 otherwise. But unlike the analysis of multiple sexual partnerships where the individual is the unit of analysis, the sexual partner is the unit of analysis in this case. The third dependent variable is the *attitude toward condom use within marriage* which is coded 1 if the individual reported some form of acceptability of condom use within marriage and 0 otherwise.⁵ Similar to the analysis of sexual partnerships, the individual is the unit of analysis. For all the three dependent variables, we estimate a fixed-effects logit model of the form:

$$\log it(\pi_{it}) = \beta X_{it} + \mu_{it} \quad [1]$$

where π_{it} is the probability of a given outcome for individual i at or prior to time t ; X_{it} is the vector of time-varying explanatory variables; β is the associated vector of parameters; μ_{it} is the disturbance term that affects a given outcome for individual i at or prior to time t and which might also be correlated with the measured characteristics. In the case of random-effects models estimated for comparison with the results from the fixed-effects analysis, μ_{it} is assumed to be independent of the measured characteristics.

Since fixed-effects analysis controls for all measured and unmeasured time-invariant characteristics, we include in our models only a few time-varying covariates as controls. These include *age*, *marital status*, and an *indicator of mobility*. The indicator of

⁵ Some form of acceptability of condom use within marriage here refers to whether the individual reported that such use is acceptable without conditions or that such use is acceptable only if the individual knows or suspects that the spouse is infected with HIV.

mobility is based on the question that asked individuals whether they had stayed outside the district for more than one month in the 12 months preceding the survey wave. Extremely mobile individuals might be at risk of having multiple sexual partners but might also be motivated to use condoms with those partners they consider to be risky. We also include *time* (coded 0 for 2004 and 1 for 2006) in our models to account for the secular trends in sexual behaviour and in attitudes toward condom use within marriage. The models for condom use further include a *dummy for sexual partnerships involving the spouse or live-in partner* and an *interaction term* between the dummy and *time* to explore the temporal changes in condom use within marriage. Due to similar patterns in the changes in sexual behaviour and attitudes toward condom use within marriage for men and women within a given study site, we only estimate separate models based on *study site*. Thus, whereas the *respondent's sex* and *education level* (secondary and above versus less than secondary) are subsumed under the fixed-effects analysis, we include them as controls in the random-effects models.

Results

Changes in sexual behaviour and attitudes

Table 3 presents the results of the between-wave comparison (2004-06) of the distribution of MDICP respondents by the indicators of sexual behaviour and attitudes and by study site. The results show that the overall trends in sexual behaviour and attitudes are distinctive. First, among those who had ever had sex, the percentage of respondents reporting no sexual partners in the past 12 months before the survey wave significantly decreased for men from all the study sites and for women from the North and Centre. At the same time, we observe corresponding significant increases in the

percentage of women and men reporting one partner in all the study sites. In contrast, the percentage of individuals reporting at least two partners in the past year significantly decreased for both women and men in all the study sites. And as would be expected, a lower percentage of women than men reported having two or more sexual partners over time and across study sites.

Taken together, the variations in sexual partnerships across time could reflect two things. One, the decline in percentage of individuals reporting no sexual partner in the past 12 months and the simultaneous increase in the percentage reporting one partner could, in part, reflect a shift to sex in marriage as individuals who were never married by the first wave subsequently transition to marriage. Two, the significant decline amongst those having two or more partners could indicate that individuals are taking fewer risks in terms of sexual activity. The difference in the percentage of women and men reporting at least two sexual partners, on the other hand, could partly be attributed to polygyny and partly to under-reporting by women or over-reporting by men. Polygyny could be part of the explanation because men in such unions will definitely have multiple sexual partners while women in similar unions will report only one partner unless they have other extra-marital partners.

<Table 3 about here>

The second observation to be made from Table 3 is that the proportion of women and men reporting having used a condom with any partner in the past 12 months significantly increased in the South and North but not in the Centre. With respect to condom use within marriage, there was no significant change in the percentage reporting such use among both women and men in the South and Centre. But we do observe a

significant increase among those from the North. Again, as would be expected, the proportion of women reporting condom use with any partner or with a spouse or live-in partner is lower than that of men in all the study sites over time. The gender difference in reported condom use could partly be attributed to the reasons similar to those of reporting multiple sexual partnerships. It could also be due to gender differences in access to condoms as well as economic power differentials that could impact on the women's ability to purchase condoms.⁶

Despite the significant increase in the percentage of individuals reporting condom use in marriage in the North, there was a decline in the percentage of women and men from the region reporting that condom use within marriage was acceptable. At the same time, the percentage reporting that such use was only acceptable if the individual suspected or knew that the partner is infected with HIV significantly increased. The increase in condom use in the North could therefore be due to increased knowledge of suspicion of the partner's HIV status. Perhaps, the fact that the MDICP offered HIV testing and the test results to consenting sample members might have contributed to such knowledge or suspicion. Worth noting, however, is the fact that the percentage of women and men reporting that condom use within marriage is not acceptable or that they did not know significantly declined across all study sites. It suggests that there is some shift in attitude toward such use even if the shift is toward acceptability of use only if the individual suspects or knows that the partner is infected with HIV.

⁶ Male condoms are, for instance, cheaper and more popularized than the female condoms. Also, women tend to be economically disadvantaged than men in most parts of sub-Saharan Africa. A corollary to this is that compared to men, women have less decision-making and/or purchasing power. A follow-up study after the 2004 MDICP HIV testing and counseling (Thornton 2005), for example, found that not only were men more likely to purchase condoms (from the follow-up survey interviewers) than women but they also purchased more condoms.

Effects of mortality on changes in sexual behaviour and attitudes

Table 4 presents the results from the fixed-effects and random-effects analyses of the effects of the indirect indicators of the magnitude of HIV/AIDS on changes in sexual behaviour and attitudes toward condom use within marriage. The indicators considered are the number of deaths in the household in the three to five years preceding the survey wave and the number of funerals attended in the one month prior to the survey round. The results of our preferred fixed-effects analysis show that the number of funerals attended has a significant effect on the probability of having multiple sexual partnerships among individuals from the South but not among those from the other study sites. Specifically, a one unit increase in the number of funerals attended is associated with a 12% reduction [$100 \times (e^{-0.13} - 1)$] in the probability of having multiple sexual partners for men and women from the region.

<Table 4 about here>

The results in Table 4 further show that none of our indicators is significantly associated with changes in condom use among individuals from the South and the North. But the fixed-effects analysis shows some significant effect of the number of funerals attended on changes in condom use among individuals from the Centre. The direction of the effect is, however, in the unexpected direction. In particular, a one unit increase in the number of funerals attended is associated with an 11% reduction [$100 \times (e^{-0.12} - 1)$] in the probability of using a condom. With respect to attitude toward condom use in marriage, again the results from the fixed-effects analysis show that it is only among individuals from the South for whom the number of funerals attended has a significant effect on such

attitude. A one unit increase in the number of funerals attended is associated with an 11% increase [$100 \times (e^{0.10} - 1)$] in the probability of having positive attitude toward condom use in marriage among men and women from the region.

What might account for the differential impact of the number of funerals on sexual behaviour and attitude toward condom use within marriage by study site? It seems that the most likely explanation is the wide variations in HIV prevalence between the three major regions of Malawi. Evidence from the 2004 MDHS, for instance, shows that HIV prevalence was slightly more than twice as high in the South (18%) as in the North (8%) or the Centre (7%). Among women, prevalence was about three times higher in the South (20%) than in the Centre (7%) and twice higher in the South than in the North (10%). A similar pattern is observed for prevalence among men (15%, 6%, and 5% in the South, North, and Centre respectively). The impact of the HIV/AIDS epidemic is therefore greater in the South than in the other regions which might explain why the number of funerals attended by individuals from the region is important for changes in sexual partnerships and in attitudes toward condom use in marriage. The low HIV prevalence in the Centre could, on the other hand, partly explain the unexpected effect of the number of funerals on condom use among individuals from the region.

Changes in condom use by relationship to sexual partner

Changes in the probability of condom use by the relationship to the sexual partner (Figure 2) based on the fixed-effects estimates show that the likelihood of using a condom with other sexual partners (excluding the spouse or live-in partner) was lower in 2006 than it was in 2004 for individuals from the South and Centre. At the same time, the likelihood

of using a condom with the spouse or live-in partner in 2004 was significantly lower than that of using a condom with other sexual partners in the same year among individuals from the South (also shown by the significant coefficient for relationship to sexual partner in Table 4). But the likelihood of such use was significantly higher in 2006: (i) than it was in 2004, and (ii) than the likelihood of use with other partners in 2006 for individuals from the region. This is also shown by the statistically significant coefficient estimate for the interaction term between the relationship to the sexual partner and the survey year in Table 4. The opposite pattern regarding condom use with the spouse or live-in partner over time is observed for individuals from the Centre (Figure 2) though none of the changes is statistically significant (Table 4).

<Figure 2 about here>

Unlike the South and Centre, the likelihood of condom use with other sexual partners was higher in 2006 than it was in 2004 for individuals from the North. But similar to the South, the likelihood of condom use with the spouse or live-in partner was higher in 2006: (i) than it was in 2004, and (ii) than the likelihood of use with other sexual partners in 2004 and 2006 for individuals from the region (Figure 2). None of these differences is, however, statistically significant (fixed-effects results in Table 4). The patterns therefore suggest increased condom use with the spouse or live-in partner over time than with other sexual partners for individuals from the South and the North. The potential explanation for this could be the reduction in the proportion of individuals having multiple sexual partners (Table 3). The Centre might be different, perhaps, because of the lower HIV prevalence compared to the other regions.

Discussion and implications

The main objective of this study was to examine changes in sexual behaviour and attitudes in the context of the HIV/AIDS epidemic in rural Malawi using the longitudinal or panel approach to examining such change. It used data collected in 2004 and 2006 from three sites to specifically explore whether there have been changes in sexual partnerships and in condom use in the past year preceding the survey wave as well as in attitude toward condom use within marriage. Whereas there is evidence that people might be changing their sexual behaviour in response to the HIV/AIDS epidemic in parts of sub-Saharan Africa, much of it is based either on the retrospective change approach or on inferences from trends in HIV prevalence and incidence. Studies examining such change based on longitudinal or panel approach are limited probably due to lack of relevant data. The study also examined whether the number of deaths in the household in the recent past and the number of funerals attended in the one month preceding the survey round-- possible indicators of the impact of the HIV/AIDS epidemic-- had any effect on changes in sexual behaviour and attitudes.

The results show significant reductions in multiple sexual partnerships and increased condom use over time in rural Malawi. In addition, changes in attitude toward condom use within marriage seem to be occurring, but mostly in the form of a reduction in the proportion of individuals who report that such use is not acceptable or that they do not know and an increase in the proportion of individuals who approve of use if the individual suspects or knows that the partner is infected with HIV. These findings are consistent with the existing literature on sexual behaviour change in Malawi and elsewhere in sub-Saharan Africa. The reduction in the percentage of individuals reporting

multiple sexual partners in the twelve months preceding the survey is, for instance, consistent with existing qualitative and quantitative evidence that suggest that it is one of the response strategies to the HIV/AIDS epidemic in Malawi. Increased condom use, on the other hand, is not only consistent with reports of condom use with sexual partners who are considered to be “risky” as another response strategy to the epidemic but also with increased condom sales in the country (see, for instance, Population Services International 2005).

Changes in sexual partnerships and condom use have implications for the future course of the HIV/AIDS epidemic in rural Malawi. Indeed declines in HIV prevalence have been noted in the urban areas of the three major regions of the country (Republic of Malawi 2006) and though some rural areas have experienced increases, these findings suggest that this is likely to change as well. Increased condom use with “risky” partners is also likely to reduce unintended births which might result from pre- or extra-marital sexual relationships. Approval of condom use within marriage when the individual suspects or knows that the partner is infected with HIV might have some implications for actual use. There is reason to believe that this might be the case given the available evidence (e.g. Adetunji and Meekers 2001) indicating that having positive attitudes toward condom use is significantly associated with consistent use. It also has implications for voluntary counselling and testing (VCT) for HIV since VCT offers one the opportunity to learn his/her HIV status and, through sharing of test results, might provide the avenue for knowing others’ HIV status as well.

The second important finding is that the number of funerals attended significantly lowers the probability of having multiple sexual partners among individuals from the

South. It also has significant effects on the probability of having positive attitudes toward condom use within marriage among individuals from the region. These findings are consistent with qualitative data from the study settings that suggest that witnessing AIDS-related deaths elicits emotions that might provide the motivation for behaviour change. It could be that if deaths increase, one might think that AIDS is increasing thereby possibly increasing the motivation to engage or support engaging in safer sex. In addition, it is in the South that we find a significant increase in the likelihood of condom use within marriage over time after controlling for all observed and unobserved factors. The South might be different, perhaps, because of the higher HIV prevalence in this than in the other regions of Malawi and is therefore the region most affected by the epidemic. These patterns suggest that the changing risk environment itself might be important for future trends in HIV prevalence in areas most affected by the epidemic.

These findings should, however, be viewed in the context of the study's limitations. To begin with, studies show that the reporting of sensitive sexual behaviour in surveys is often problematic (see for instance, Eggleston et al. 2000; Fenton et al. 2001; Buvé et al. 2001; Mensch et al. 2003; Curtis and Sutherland 2004). We, however, expect that whereas reporting error might affect cross-sectional inferences about sexual behaviour, it should have little effect on the longitudinal interpretations. For example, if men over-report condom use at each survey round, we expect this to affect the interpretations of the level of male condom use at each survey round but not the changes in use over time. There is a caveat to this though. In particular, differences in reporting over time could also be affected by the environment. For instance, reported condom use

over time could be affected by the increasing availability of condoms or if there was some specific program targeting condom use between survey rounds.

This leads to the second limitation of the study i.e. the inability to examine the impact of HIV/AIDS programs on changes in sexual behaviour and attitudes. There is no denying the fact that such programs are important for sexual behaviour and attitude change but data limitations could not allow us to examine these as well. We could, for instance, use data on sources of HIV/AIDS information in the one month preceding the survey as a proxy measure for HIV/AIDS program effort. But such information was only collected in 2004 but not in 2006. Finally, the study assumes that the number of funerals attended in the one month preceding the survey reflects the average for the period between the two waves. This may, however, not be the case in the context of rapidly increasing or declining death rates. Nonetheless, adult mortality in Malawi has remained fairly stable since 1997 though estimates of under-five mortality during the 15 years preceding the survey show some declines (NSO and ORC Macro 2005). This suggests that the assumption about the number of funerals attended might be reasonable since it is unlikely that substantial declines might have occurred in under-five mortality within the two-year period.

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Table 1: MDICP sample size, interview completion and attrition, 2004-06

	MDICP 2004			MDICP 2006		
	Men	Women	Both	Men	Women	Both
Number of individuals ^a	1,946	2,258	4,204	2,103	2,365	4,468
Interviewed (percent)	75.3	78.7	77.0	68.8	74.3	71.7
Attrition (percent) ^b	18.9	16.2	17.2	19.8	18.6	19.1
Refusal	0.7	0.3	0.5	1.8	1.4	1.6
Mobility ^c	12.9	11.3	11.9	13.8	12.8	13.2
Mortality	2.7	2.0	2.2	1.5	1.2	1.3
Other factors	2.6	2.6	2.6	2.7	3.2	3.0

Notes: ^aThe sample size including those who were not interviewed due to refusal, mobility and other factors; ^bPercentage of individuals who were successfully interviewed in the previous but not in the current wave: for 2004, this refers to the percentage of individuals who were interviewed in either 1998 or 2001 but not in 2004; ^cPercentages include temporary absentees and out-migrants from the study sites with the latter accounting for the largest share of those who were mobile; Columns for 'both' refer to both men and women; MDICP- Malawi Diffusion and Ideational Change Project.

Table 2: Percent distribution of interviewed respondents by selected background characteristics, MDICP 2004-06

Characteristics	MDICP 2004			MDICP 2006		
	Men	Women	Both	Men	Women	Both
Age group						
15-24	32.1	33.2	32.7	27.0	27.3	27.1
25-34	16.1	27.5	22.4	22.6	28.9	26.1
35-44	20.5	22.2	21.4	20.8	23.7	22.4
45+	31.4	17.1	23.5	29.7	20.1	24.4
Study site						
South	33.9	34.8	34.4	33.4	34.3	33.9
Centre	33.9	33.6	33.8	32.4	32.2	32.3
North	32.1	31.6	31.8	34.2	33.5	33.8
Highest education level						
No schooling	11.8	17.3	14.9	18.0	30.0	24.6
Primary schooling	69.6	73.8	71.9	61.8	60.3	61.0
Secondary and above	18.6	8.9	13.2	20.2	9.7	14.4
Current marital status						
Never married	25.5	13.2	18.6	17.2	6.1	11.1
Currently married	74.1	78.8	76.7	81.1	84.7	83.1
Formerly married ^a	0.4	8.0	4.7	1.7	9.2	5.8
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of individuals	1,466	1,777	3,243	1,447	1,756	3,203

Notes: ^aFormerly married refers to those who were separated, divorced or widowed; Percentages may not add up to exactly 100 in some cases due to round-off error; Columns for 'both' refer to both men and women; MDICP- Malawi Diffusion and Ideational Change Project.

Table 3: Indicators of sexual behaviour and attitude change among MDICP respondents by study site and by sex, 2004-06

Indicators of sexual behaviour	South			Centre			North			All sites		
	2004	2006	Sig ^a	2004	2006	Sig ^a	2004	2006	Sig ^a	2004	2006	Sig ^a
Recent sexual partnerships (percent) ^b												
Men												
0	13.0	4.3	**	15.7	7.4	**	15.6	9.6	**	14.7	7.1	**
1	51.3	69.6	**	57.3	78.0	**	57.5	69.6	**	55.3	72.4	**
2+	35.7	26.2	**	27.1	14.4	**	26.9	20.8	*	30.1	20.6	**
Women												
0	15.2	13.1	ns	20.0	8.8	**	18.7	13.0	*	17.9	11.7	**
1	68.9	84.6	**	70.2	89.9	**	77.2	86.6	**	71.9	87.0	**
2+	15.9	2.4	**	9.7	1.3	**	4.1	0.4	**	10.2	1.4	**
Condom use with any partner (percent) ^c												
Men												
	25.4	32.9	*	28.7	35.0	ns	38.7	48.9	**	30.4	38.6	**
Women												
	14.8	23.3	**	16.3	20.4	ns	26.5	39.3	**	18.8	27.4	**
Condom use within marriage (percent) ^d												
Men												
	16.5	16.8	ns	20.8	20.0	ns	26.1	36.9	**	20.8	24.6	*
Women												
	11.3	12.8	ns	14.6	12.7	ns	23.4	29.0	*	15.9	17.5	ns
Attitude toward condom use in marriage												
Men (percent)												
Not acceptable/ don't know	23.9	17.6	*	37.9	28.9	**	33.5	16.1	**	31.6	20.8	**
Acceptable only if partner infected	25.5	38.0	**	34.2	38.9	ns	32.4	57.7	**	30.8	45.0	**
Acceptable	50.6	44.4	ns	27.9	32.1	ns	34.1	26.2	**	37.6	34.2	ns
Women (percent)												
Not acceptable/ don't know	25.8	14.6	**	39.8	25.8	**	36.7	21.8	**	34.0	20.7	**
Acceptable only if partner infected	24.8	29.3	ns	24.2	35.2	**	26.0	54.2	**	25.0	39.6	**
Acceptable	49.4	56.1	*	36.1	39.0	ns	37.3	24.0	**	41.1	39.6	ns

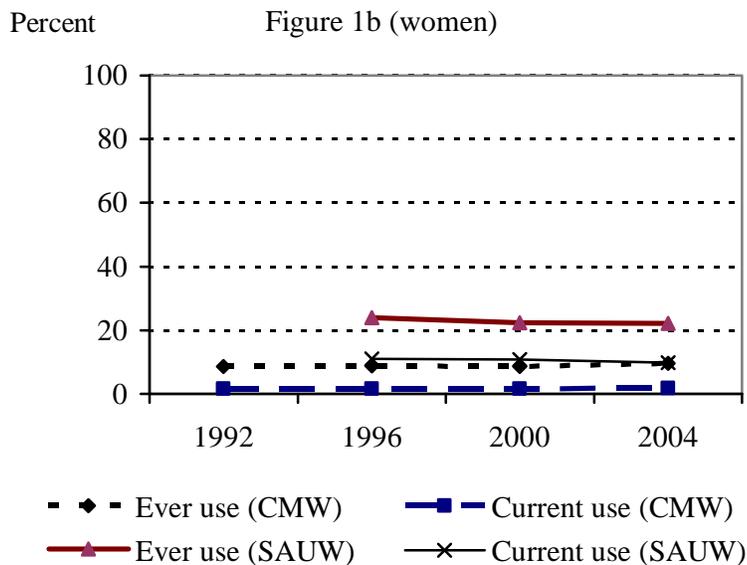
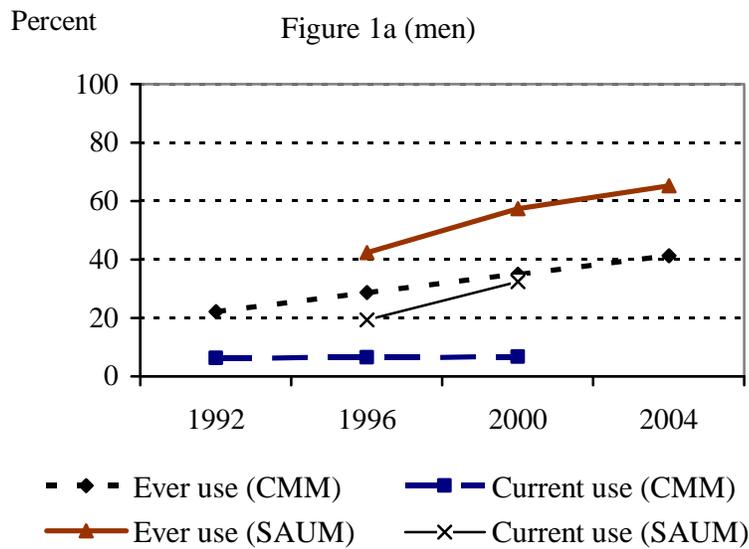
Notes: ^aSignificance tests of proportions: *p<0.05, **p<0.01, ns- not statistically significant; ^bPercentage of individuals who had ever had sex by the number of sexual partnerships in the 12 months preceding the survey; ^cPercentage of individuals who had sex in the past 12 months prior to the survey who used a condom with any of up to three sexual partners; ^dPercentage of sexual partnerships involving the spouse or live-in partner in the past 12 months before the survey in which a condom was used.

Table 4: The effects of the indirect indicators of the evolution of HIV/AIDS on the probability of changes in sexual partnerships, condom use, and in attitudes toward condom use within marriage among MDICP respondents, 2004-06

Covariates	Sexual partnerships					
	South		Centre		North	
	FE	RE	FE	RE	FE	RE
Number of deaths in household	0.02 (0.21)	0.02 (0.09)	-0.06 (0.22)	0.13 (0.11)	-0.32 (0.30)	0.19 (0.12)
Number of funerals attended	-0.13* (0.06)	0.06 (0.03)	0.10 (0.09)	0.07 (0.04)	0.23 (0.14)	0.08 (0.05)
Survey year (2006 = 1)	-1.65** (0.26)	-1.09** (0.15)	-1.32** (0.30)	-1.20** (0.19)	-0.78* (0.34)	-0.64** (0.20)
	Condom use					
Number of deaths in household	0.03 (0.14)	0.03 (0.08)	-0.09 (0.14)	-0.29* (0.10)	0.17 (0.15)	0.03 (0.09)
Number of funerals attended	0.06 (0.05)	0.05 (0.03)	-0.12* (0.06)	-0.07 (0.04)	0.04 (0.06)	0.05 (0.03)
Relationship to sexual partner (spouse = 1)	-0.84** (0.28)	-0.79** (0.23)	0.45 (0.33)	-0.04 (0.27)	0.28 (0.31)	0.31 (0.26)
Survey year (2006 = 1)	-0.36 (0.24)	-0.31 (0.20)	-0.10 (0.31)	0.06 (0.24)	0.34 (0.31)	0.53* (0.25)
Relationship × Survey year	0.79** (0.30)	0.59* (0.26)	-0.49 (0.36)	-0.28 (0.30)	0.15 (0.33)	-0.16 (0.29)
	Attitude toward condom use within marriage					
Number of deaths in household	-0.09 (0.11)	-0.05 (0.07)	0.05 (0.12)	0.02 (0.07)	0.07 (0.14)	0.05 (0.08)
Number of funerals attended	0.10* (0.05)	0.01 (0.03)	0.04 (0.05)	0.02 (0.03)	0.10 (0.06)	0.07* (0.03)
Survey year (2006 = 1)	0.68** (0.16)	0.71** (0.12)	0.60** (0.15)	0.68** (0.12)	1.00** (0.16)	0.99** (0.12)
<i>N</i>						
Sexual partnerships	276	2,004	180	1,771	136	1,814
Condom use	1,019	3,619	806	2,801	914	1,126
Attitude	428	2,074	484	1,861	562	1,998

Notes: FE- fixed-effects estimates; RE- random-effects estimates; All models control for the respondent's age, current marital status, and mobility (whether the individual had stayed outside the district for more than one month in the 12 months preceding the survey wave); Random-effects models additionally control for the respondent's sex and education and, as opposed to fixed-effects estimates, assume that the unobserved characteristics are independent of the measured characteristics; *p<0.05; **p<0.01.

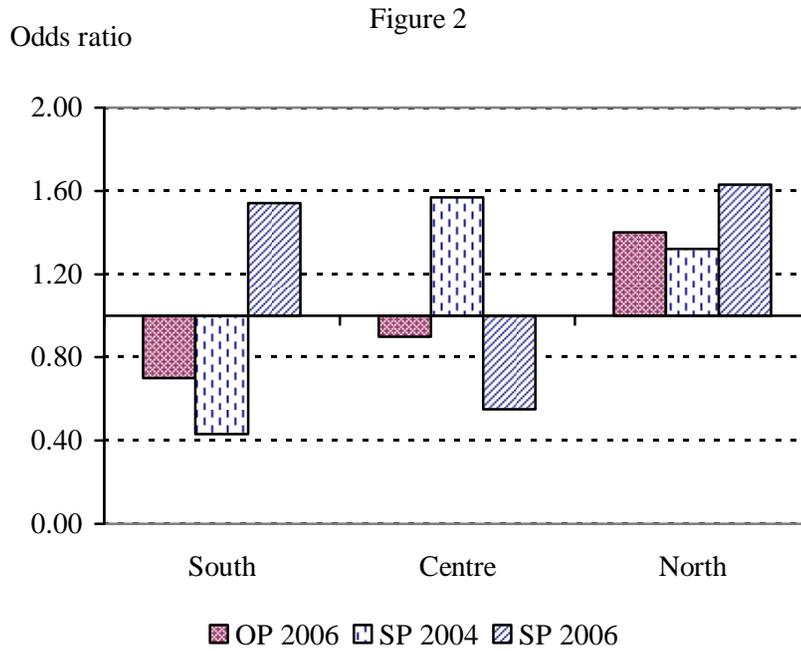
Figures 1a-b: Trends in ever and current use of condoms among married and sexually active unmarried men and women in Malawi, MDHS 1992-2004



Notes: CMM- currently married men; SAUM- sexually active unmarried men; CMW- currently married women; SAUW- sexually active unmarried women; Sexually active- those who reported having had sex in the 30 days preceding the survey; MDHS- Malawi Demographic and Health Survey.

Sources: NSO and Macro International Inc. 1994; 1997; NSO and ORC Macro 2001; 2005.

Figure 2: Odds ratios for condom use by the relationship to sexual partner and by survey wave based on fixed-effects estimates, MDICP 2004-06



Notes: OP- other partners; SP- spouse or live-in partner; Condom use with other partners in 2004 is the reference category (odds ratio = 1.00); The fixed-effects models controlled for the respondent's age, current marital status, and mobility (whether the individual had stayed outside the district for more than one month in the 12 months preceding the survey wave).