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Short Communication

Linking Migration, Mobility, and HIV

Kevin D. DEANE (1)
Justin O. PARKHURST (2)
Deborah JOHNSTON (1)

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1 - School of Oriental and African Studies
2 – London School of Hygiene and Tropical Medicine

Kevin Deane has a Bloomsbury Colleges PHD Studentship

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Abstract

Population mobility is commonly identified as a key driver of the HIV epidemic, both linking geographically separate epidemics and intensifying transmission through inducing riskier sexual behaviours. However, beyond the well known case studies of South African miners and East African truck drivers, the evidence on the links between HIV and mobility is nuanced, contradictory and inconclusive, and is in part due to the abstract definitions of mobility used in different studies. This problematic conception of mobility, with no reference to who moves, their motivations for moving, or the characteristics of sending and receiving areas, can have a dramatic impact on how one understands the influence which this structural factor has on HIV risk in different settings. Future research on mobility and HIV transmission must incorporate an understanding of migration and mobility as dynamic processes and link different patterns and forms of mobility with location-specific sexual networks and HIV epidemiology.

Correspondence and proofs:

Kevin Deane
38 The Street
Old Basing
Hants
RG24 7BX

Tel: 07835 771342

E-mail: 160960@soas.ac.uk

Introduction

Mobility and population migration are important human processes affecting a broad range of social outcomes. The 2009 World Development Report, for instance, explores the positive development impact of population mobility resulting both from remittance flows and the concentration of skills in geographical areas with the greatest economic potential (Mendola 2006; Skeldon 2008; World Bank 2008; Chappell and Glennie 2009). Public health literature, however, has often argued that mobility is a key driver of the HIV/AIDS epidemic (Jochelson et al. 1991; Barongo et al. 1992; Quinn 1994). This paper reviews this literature on the role played by mobility in HIV transmission, particularly that work from an epidemiological (or social epidemiological) approach which often presents migration as directly linked to risky sexual practices. However, insights from the broader field of migration studies are rarely invoked to explain the relationship between HIV/AIDS and migration. This paper seeks to integrate such insights. Finally, the paper discusses three studies arising from the same epidemiological cohort based in Tanzania to reflect on some of these issues. The complex nature of the roles mobility can play is illustrated, suggesting that statements which present mobility as a single direct ‘driver’ of HIV, or correlated with HIV risk behaviour, may miss several key issues resulting from the complex nature of migration. Of particular relevance are the type of migration, the reasons and motivations for migration, and the characteristics of the areas between which migrants move – all of which will influence either the patterning of risk behaviour, or the risk of any given behavioural patterns. Finally the article concludes with discussion of how to better integrate these issues to guide HIV prevention efforts.

Linking HIV and Mobility

Numerous statements exist about the impact of mobility and migration on HIV (Hope 2001; Boerma et al. 2003; Clift et al. 2003; Lagarde, Schim et al. 2003; Lurie et al. 2003; Coffee et al. 2005; Crush et al. 2006; Kishamawe et al. 2006; Mundandi et al. 2006; Mmbaga et al. 2008; Campbell 2009) but few studies have attempted an in-depth analysis, or estimated the impact it has in a systematic way. The most common lines of enquiry seek to show one of two dynamics. First, mobility can increase the rate of human interaction and expose individuals to sexual partners coming from areas of higher background prevalence rates (Coffee et al 2007). Second, many studies look for statistical associations between migration and reported risky behaviours, implying something inherent in the characteristics of mobility

leads to higher levels of risky sexual behaviour (and hence HIV incidence) (Lagarde et al. 2003; Lydie et al. 2004; Kishamawe et al. 2006; Khan et al 2008; Mundandi et al. 2006; Vissers et al 2008.) This second mechanism has been the main focus of the epidemiological migration literature, which typically attempts to establish mobility as a risk factor by comparing risk behaviours and prevalence between ‘mobile’ and ‘non-mobile’ groups. From this approach a number of papers have supported the view that mobility is a risk factor for HIV infection (Carswell et al. 1989; Pison et al. 1993; Quinn 1994; Girdler-brown 1998; Boerma et al. 1999; Brockerhoff and Biddlecom 1999; Hope 2001; Boerma et al. 2002; Lagarde et al. 2003; Lurie et al. 2003; Lurie et al. 2003a; Zuma et al. 2003; Lydie et al. 2004; Crush et al. 2005; Zuma et al. 2005; Crush et al. 2006; Kishamawe et al. 2006; Khan et al 2008; Mmbaga et al. 2008; Vissers et al. 2008; Voeten et al. 2009). Two occupational groups have received the greatest attention: circulatory migrant labourers working in South African mines (Lurie et al. 2003; Lurie et al. 2003a; Zuma et al. 2003; Crush et al. 2005; Zuma et al. 2005; Hargrove 2008; Campbell 2009), and East African Truck drivers (Carswell et al. 1989; Douglas 2000; Ramjee and Gouws 2002; Kamwanga et al. 2006).

However, it is also apparent that multiple case-studies have found little or no link between mobility and HIV/AIDS risk (Coast 2006; Coffee et al. 2005; Mundandi et al. 2006). These conflicting results may partly be due to the large degree of heterogeneity in the processes considered as ‘mobility’, which can include: urbanisation, seasonal and circulatory migration, rural to rural migration, commuting, internal displacement, and international forced migration, alongside mobility that is motivated by sexual behaviour, such as movement by polygamous males. This heterogeneity is rarely reflected in the literature, where the definition of mobility and scope of enquiry is often limited (Lagarde et al. 2003; Lydie et al. 2004; Kishamawe et al. 2006; Khan et al 2008; Mundandi et al. 2006; Mmbaga et al. 2008; Vissers et al. 2008; Voeten et al. 2009).

The field of social epidemiology has developed theoretical frameworks which help to map out the causal pathways between upstream ‘structural’ factors (such as migration, or even the broader social, political, and economic determinants that lead to migration), and downstream outcomes such as HIV infection. The ‘proximate determinants framework’ is one such model used in HIV studies that attempts to identify more clearly the causal pathways from structural

factors to HIV infection (Boerma and Weir 2004; Zaba et al 2005). This approach illustrates how a practice such as migration may act along a causal chain from broader distal (structural) factors down to the more direct and immediate determinants of HIV infection. However, accepting a structural approach has direct consequences for studying causality in health (Glass and McAtee 2006). Critically, this approach points to the fact that any distal structural factor (economic, social, political) can play out in a variety of ways downstream. Migration may be a response to broader social forces, and it may also in itself play out in different ways. Finally, and critically, in order to influence HIV risk, any distal factor must do so by changing more direct proximal factors - migration must affect a factor that related to number of potential exposures (number of partners, number of sex acts, partners from a higher prevalence community, etc), or affect factors that mediate risk for any given sex act (condom use, presence of other infections, etc) – all of which may change over the course of an HIV epidemic.

Understanding the role of migration in this regard significantly complicates attempts to explain migrations ‘impacts’ and requires more nuanced understandings of both the manifestations of migration as well as the resulting changes in proximate determinants of HIV infection in different settings and at different times. One result is that looking for statistical associations of a defined variable seen to capture ‘migration’ with HIV infection or risk behaviour will be exceedingly, or even prohibitively, complex. It points to the need to recognise the multiple reasons for migration, the differing migration flows that result, and finally the diverse behavioural practices that arise in given settings. It also requires knowledge of the local epidemiological context to see how these may play out with regard to more proximal determinants of HIV infection.

Whilst some commentaries do provide more comprehensive analyses, examining multiple flows within a given population (Brockerhoff and Biddlecom 1999; Coffee et al. 2005) or are directed at specific kinds of migration (Pison et al. 1993; Coast 2006) the general lack of a more nuanced theoretical conception of mobility leads to many broad or incompatible definitions of mobility. The result is that data has often been interpreted in different ways, allowing few, if any, consistent hypotheses about mobility and HIV transmission to be made. These problems are illustrative of the methodological issues faced by much of the

epidemiological literature (Lagarde et al. 2003; Lydie et al. 2004; Kishamawe et al. 2006; Khan et al 2008; Mundandi et al. 2006; Vissers et al 2008), which use more limited conceptions of migration or mobility. For example, Lydie et al (2004), defining mobility groups as ‘no absence’, ‘being away for equal to or less than 31 days’, or ‘being away for more than 31 days’, found strong associations between mobility and increasing HIV infection for men, but not for women. Lagarde et al (2003), distinguishing between ‘long term’ and ‘short term’ mobility found that for women, short term but not long term mobility was associated with higher HIV infection, but for men, both short term and long term mobility were associated with higher HIV infection. Conversely, Khan et al (2008) found that mobility was associated with higher HIV infection and risk behaviours for women, but not men.

Yet a broader literature on migration exists outside the field of public health which can help to explore some of these aspects – in particular the variety of forms of migration and how they develop as responses to structural social factors. This literature in particular points to a number of characteristics of migration that can affect behaviour, which includes not just duration of migration, but the driving reasons for migration, and the nature of the destination as well (Fawcett 1989; Massey et al. 1993; Mendola 2006). In particular, the nature of local networks and the history of migration to the destination area will affect the extent to which migrants are integrated into local networks and/or adopt local customs or maintain those from the origin area (Boyd 1989; Fawcett 1989, Portes 1989). At the same time, the location of migrants in the local labour market will determine not only their levels of absolute and relative income, and thus their ability to engage in certain social practices, but also local perceptions of migrants (Poire 1979; Portes 1978) These factors will determine how migrants behaviour will change and how they are integrated into the destination area.

The example of Kisesa, Tanzania

To reflect on some of the ways mobility’s links to HIV risk have been approached in epidemiological studies, three studies based on the same epidemiological cohort in the Kisesa ward of Tanzania are discussed. Established in 1994, this cohort includes HIV testing in each surveillance round. Three papers have been published (in 1999, 2006 and 2008) from the same cohort investigating the relationship between mobility and HIV risk (Boerma et al.

1999; Kishamawe et al. 2006; Vissers et al. 2008), yet they come to rather different conclusions about the nature of this relationship.

The studies based on this cohort, however, used different definitions and interpretations of mobility. In 1999, Boerma et al (1999) analysed the cohort data by pre-defined areas (classified as rural, peri trading centre and trading centre), with the aim of investigating the differences in prevalence and behaviours between those areas. Mobility was defined as either having moved between the years 1994 to 1996, or having moved into the current household within the last 5 years. In 2006, Kishamawe et al categorised individuals as 'long term mobile', 'short term mobile', or 'resident', with mobility status based on whether they had either been living or briefly staying elsewhere the night before at least one of the 5 demographic rounds. Finally, in 2008, Vissers et al defined couples as 'co-resident' or 'living apart', and individuals as 'non-mobile' or 'mobile', based on having slept outside the home more than 10 times in the last year (although not distinguishing between the length of a stay elsewhere). For couples classified as 'living apart', it was further determined if there were 'few' or 'many' visits from the spouse, with 'many' defined as 2 or more visits per week.

These studies illustrate the ways that mobility and migration can represent a variety of potential behaviour patterns. Unsurprisingly, with such different ways to define and classify mobility, the findings of the studies also varied. Boerma et al found the highest levels of risky sexual behaviour, HIV prevalence and mobility in the trading center. They conclude that mobility influences the spread of HIV through more frequent travelling and greater influxes of travellers to the trading center.

Kishamawe et al found that for men, there was no statistically significant difference between their 3 groups in terms of HIV prevalence or incidence and the only statistically significant difference found by univariate analysis was that short-term mobile men were more likely to have had two or more sex partners than long term mobile or resident men. For women, long-term mobile women had statistically higher levels of riskier behaviour and HIV prevalence rates. Further analysis of these data found that resident men with long term mobile wives had the highest levels of HIV prevalence, and also engaged in significantly higher levels of risky sexual behaviour. These results begin to point to the complexity of the relationship between

mobility and risk behaviours, illustrating that previous works which simply have attempted to show if mobility 'is' or 'is not' a determinant of risk behaviour (e.g. (Pison et al 1993; Lagarde et al 2003; Lydie et al 2004)) may not have asked nuanced enough questions. The classification of mobility selected has only limited success in explaining under which circumstances mobility increases risk behaviours and prevalence. Interestingly, the findings also appear at odds with the strong conclusions made by the authors about the relationship between mobility and HIV risk.

In comparison in 2008, Vissers and colleagues, analysing the same cohort, found that 'co-resident mobile' men (cohabitating but slept outside the household 10 or more times in the previous year) had significantly higher levels of risky behaviour than co-resident non-mobile men, a result that seems to contradict Kishamawe et al's 2006 results which had found the highest levels of risky behaviour among resident men who had mobile spouses. However, different reported risk behaviours were not reflected in differing HIV prevalence rates amongst males. For women, Vissers et al report no significant differences between the groups for either risky behaviour or prevalence, though the nominal prevalence rate was higher for non-mobile coresident women than it was for mobile coresident women, conflicting with the highly significant results for long term mobile women reported by Kishamawe et al.

The reasons for such differences between findings from this single cohort may be that the definitions of 'mobility' differed and importantly that the definitions may not have reflected all the critical characteristics of local mobility. The broader migration literature has found that the impact of migration on social behaviour generally will be markedly different depending on such characteristics, discussed above. The differences in results may also be due to changes in the nature of the epidemic over time¹, and the refinement of the statistical approach between papers.

Rather than looking for universal correlations, studies linking HIV risk to migration will need to investigate the behavioural patterns associated with the dominant forms of migration in a specific context (economic, family, forced, urbanisation, etc), as well as understanding the

¹ The main temporal difference in between the Boerma et al paper, which was based on data from 1994 and 1996, whereas the papers by Kishamawe et al and Vissers et al were based on interviews conducted in 1996 and 2002 (Kishamawe et al) and 2003 (Vissers et al)

differences in background prevalence rates between the communities linked by migrants (Coffee et al. 2007). The studies from the Kisesa cohort have illustrated the importance of this in particular, beginning to identify different aspects of migration that may be important, but not yet addressing all the potential ways migration may play out in the causal pathway from structural distal factors to proximate risks that the proximate determinants framework illustrates.

Discussion

This review highlights a number of the challenges faced in understanding the relationship between migration and HIV risk. First, it has shown that the definition of mobility is important and should be rooted in a detailed conceptual understanding of the dominant characteristics of mobility in any area, as well as engagement with the theoretical literature on migration (Boyd 1989; Byerlee 1974; Fawcett 1989; Hagen-Zanker 2008; Harris and Todaro 1970; Massey et al 1993; Poire 1979; Portes and Borocz 1989; Stark and Bloom 1985; Wood 1982). The notion of mobility must be disaggregated to understand more about how and why people migrate, something rarely attempted in epidemiological studies to date, which often use a single indicator to capture the range of potential migration experiences. Some longer term studies (e.g. cohort studies) have attempted to use varied definitions of migration, but the results illustrate the need to explore these concepts further, and the impossibility of finding a single causal determinant for a more distal factor such as migration.

Second, many analyses focus solely on the relationship between mobility and number of partners (Kishamawe et al 2006; Lagarde et al; Mundandi et al 2006), thereby obscuring the more complex dynamics for HIV incidence. The background prevalence rates of different areas and the changing structure or overlap of sexual networks may shift HIV spread dynamics, regardless of total numbers of partners for individuals. The Kisesa cohort team, for instance, are currently tracking the impact of the movement of infected persons on community prevalence rates, but such factors are rarely incorporated into epidemiological analyses, many of which continue to present static snapshots of the relationship between mobility and HIV.

Finally, the increasing use and understanding of the multiple causal pathways from distal structural factors to proximate determinants of HIV (or other health conditions) allows future work to conceptualise how social processes and social relations influence the risk environment through biological and behavioural factors (Boerma and Weir 2004; Glass and McAtee 2006; Zaba et al 2005). However, in practice, many epidemiological studies still reduce distal factors to individual characteristics or properties, with the result that conceptual advances have not been accompanied by methodological advances that are capable of conceptualising and treating processes such as migration as something concretely different to biological or behavioural traits.

The result so far in HIV research has been an abstract formulation of mobility and sexuality which lacks a dynamic content, removing it from the fluid economic and social processes within which mobility is located. Future work must embrace a more targeted approach to enhance our understandings of the link between mobility and the spread of HIV in particular areas, and to enable the design of new and more location-specific interventions to mitigate risk enhancement due to changes in population movements, or to improve HIV resilience. For any given target population, this should include, but not be limited to, incorporating a thorough understanding of: who moves, the specific form of mobility engaged in, why they move, and the characteristics of sending and receiving areas. Furthermore it must link mobility patterns to both sexual networking and location-specific HIV epidemiology. Addressing the structural drivers of HIV infection is a growing concern, and has been proposed as a critical future avenue for both epidemiological studies and programmatic interventions alike (Auerbach et al 2009; Gupta et al 2008). Structural approaches recognise that statistical techniques designed to isolate biological and behavioural risk factors may not be best placed to study broader dynamic social processes without complementary methods (Glass and McAtee 2006). Future research will need to incorporate methodological techniques from other social sciences, such as those used to study migration itself (Bertaux-Wiame 1979; Fawcett and Arnold 1987; Massey 1987; Miles and Crush 1993).

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