Ubiquitous burden: quantifying the contribution of migration to AIDS and tuberculosis mortality in rural South Africa. A population-based surveillance study

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Introduction

Migration and health hold a complex relationship.[1, 2] The direction and impact of the relationship depend on the type of migration, the health measure and the setting. Migration between settings with different disease burdens can change the health profiles of migrants, host communities and origin communities.[2] If healthier people migrate, over time this will lower the overall health status at origin, whereas at the destination health effects largely reflect local disease prevalences. There can be escalating risks for migrants in the destination population, for example of acquiring a sexually transmitted infection or occupational disease, or risks could reduce over time through migrants acquiring better knowledge of the host community and its health systems. Migrants are not a random sample of the origin population, but tend to have more skill, higher aspirations and better health status.[3, 4]This is particularly the case when the origin is more deprived than the destination, as often holds with rural to urban migration. An example is the migration of skilled health professionals leaving poorer communities for urban environments, thus lowering the quality of care available in already deprived settings.[5] However, counter effects are possible when people with poorer health migrate from a better resourced (often urban) situation to a poorer one, seeking the benefit of family care despite a decline in access to health services.[1, 6]

Poor urban conditions, rural attachment and cheaper transport have led to a rapid rise in circular migration.[7] This pattern involves a household deliberately sending a migrant, often a person endowed with health and skills, to an urban environment as part of a strategy to improve household welfare, distribute economic risks and diversify livelihoods.[8] When these migrants fall ill they are likely to return to their origin communities. This movement is hidden to policy makers because it counters the 'healthy migrant hypothesis'[9, 10]and is not easily detectable in censuses and national surveys.

South Africa has been a focus for studies on migration and HIV.[11-14] An important advance in understanding the link between exposure to migration and HIV/AIDS was the shift in perspective from one where migration serves to distribute HIV, to the insight that certain types of migration favour HIV epidemics.[12] Migration relates to HIV transmission; however migration itself is a complex variable to define and measure. Selection occurs at an individual level because migrants are typically young and healthy;[15] they may be at higher risk of sexually transmitted infections due to risky behaviour. Disruption of family life and normal sexual relations can produce a loosening in social controls; [16, 17]urban work environments maybe more conducive to casual sex and alcohol consumption.[16, 17]There may be anxiety associated with familial disruption.[17] A migrant partner away from home for an extended period can influence sexual networks for the remaining partner; a combination of sexual and financial needs influence the risk of extramarital relationships, which, if accompanied by unprotected sex, can lead to the spread of HIV.[16, 18]

(UNAIDS/WHO evaluation of HIV infected population, HAART needs and coverage, government plan)

It remains to be seen whether long-standing rural-urban inequities affect the distribution of these services. Another dimension is the return of labour migrants who are ill, some terminally so, to their rural areas of origin. This can profoundly impact the effectiveness of plans to improve public sector

HAART services. The paper aims to estimate the extent to which migrants are contributing to AIDS or tuberculosis mortality in a rural sub-district population.

Methods

A health and socio-demographic surveillance system, which extends across a rural sub-district, was used to provide a cohort from which accurate mortality estimates could be estimated. A 'competing risks' framework was used to obtain 'cause-deleted' life-tables, which does not assume that the competing risks of a person of dying from another cause are independent.[19] To estimate the proportions of excess mortality attributable to returned migrants with AIDS and/or tuberculosis, the life table for the population was computed with and without returned migrants, and with and without deaths caused by AIDS and/or tuberculosis.

The study population

(details on the study location, demographic structure, economic activities, health facilities)

Health and socio-demographic surveillance

(details on HDSS procedures: registration and routine update of vital events and migrations, verbal autopsy questionnaires validation, ICD-10 cause of death coding, ethical clearance)

Results

Gross migration rate increased from 17·1% of the population in 1994-1997 to 23·5% in 2003-2006. Despite non-linear trends, the general pattern was of intensifying migration with levels of in-, out- and gross migration showing marked increase. The mortality pattern showed a crude death rate almost tripling from 0·55% to 1·46% over the 12-years 1994-2006; the crude birth rate remained almost constant (between 2·5% and 2·4%) and the rate of natural increase halved from 1·95% to 0·97%. From 1994-1997 to 2003-2006 life expectancy declined by 20·7 years, only slightly less for females than for males.

The contribution of returned migrants to reduced life expectancy was 1·6 years in the first period 1994-1997 (0·2 years for females, 2·8 years for males); but was 8·5 years in the latest period 2003-2006 (5·2 years for females, 10·4 years for males). Over the entire period, the contribution of returned migrants to the decline in life expectancy was 6·9 years [95% CI 6·5–7·2], which is 30·6% [95% CI 29·6–31·6] of the total 22·5 years lost. Disaggregating by gender results in 23·3% [95% CI 22·2–24·2] of the life expectancy decline for females and 34·6% [95% CI 32·6–36·3] for males that were caused by returned migrants dying from AIDS or tuberculosis. Excluding deaths from AIDS and tuberculosis among recently returned migrants showed that this component of the mortality contributed 41·2% to the overall loss in life expectancy, with a great disparity by gender: 57·6% [95% CI 57·0–58·4] for males and 31·6% [95% CI 31·6–32·0] for females.

A year after in-migration was the highest mortality risk period. Male migrants show a significant and markedly increasing risk of death. The migrant death rate among males one year after moving back to rural Agincourt increased from 2·5% [95% CI 1·8–3·4]in 1994-1997 to 18·0% [95% CI 15·9–20·4]in 2003-2006, well above the non-migrant level of 2·2% [95% CI 1·9–2·4]. Female migrants showed a less marked but still significant increase in death rate over the same period, from 0·5% [95% CI 0·3–0·9] to 4·8% [95% CI 4·0–5·7] against 1·7% [95% CI 1·6–1·9] for non-migrants.

Discussion and conclusions

In much of Southern Africa, rural populations lack the means of consistent local livelihoods and are therefore dependent on labour. Families diversify their livelihood strategies to include both urban and rural settings through migration.[20] Migration produces a flow of resources between rural and

urban areas including financial and other assets, knowledge and social support. It is therefore important to study the impact of migration on the health and wellbeing of migrants and their households and to consider broader health and social policy implications.

In examining the migration and health relationship, a frequent barrier in low-income settings is incomplete vital registration and a paucity of data. Longitudinal data are needed to unravel the positive from negative effects of migration. The health and socio-demographic surveillance system provides such a cohort, keeping track of household entries and exits as well as births and deaths by probable cause. The Agincourt health and socio-demographic surveillance system provides insight into the temporal population dynamics of poor rural communities in South and southern Africa with high levels of labour migration.

The contribution of AIDS and tuberculosis deaths among returned migrants to the trend in increasing crude death rate was much higher, 64·1% [95% CI 63·7–64·6], than their contribution to loss in life expectancy, 41·2% [95% CI 40·4–42·2].

The findings show that the contribution of recently returned migrants to the loss in life expectancy was more pronounced for males than for females. Although female migrants also contributed to this loss, the male returning migrants were more affected by AIDS and tuberculosis than non-migrant (i.e. resident) males and females. Female migration flows were only marginally less intense than those of males so the higher contribution of HIV and tuberculosis infected male migrants to the reduction in life expectancy cannot be attributed to a higher share in migration flows. Indeed, return migration rates show less gender difference than out-migration rates. Hence it is likely that differences in living conditions at a migrant's destination, and their consequences for sexual behaviour and risk behaviour more generally have contributed to the differential mortality impact of returning migration by gender. Further investigation is needed to understand how the phenomenon of "returning home to die" is associated with loss of household income through remittances, increased cost of household health care and funerals, and further loss of household income through the opportunity cost of household members' caring for a severely ill person.[6]

From a health systems perspective, rising mortality in rural South Africa has been coupled with falling numbers of public sector beds. During the 2003-2006 period, when patients were most in need of public health services, public hospital beds in Mpumalanga and Limpopo, (the provincial settings typified by the study area), declined from 201 per 100 000 population in 2002 to 152 in 2007. Strengthening health systems, particularly for chronic care, is vital due to high prevalence of AIDS and tuberculosis as well as emerging non-communicable diseases in a context of rapid health transition. A particular challenge arising from this ubiquitous impact of AIDS, tuberculosis and other chronic diseases is the need for effective clinic information systems. Equally, referral mechanisms are needed that are capable of spanning long distances and different settlement types to maintain continuity of health care of returned migrants. Patient-retained health books[21, 22] would help primary care systems to care for a mobile population affected by AIDS and tuberculosis as well as emergent chronic conditions such as diabetes, hypertension and mental disorders. Responses appropriate to rural South Africa would be widely applicable across southern Africa, given a regional economy largely defined by South African mining, industrialisation and manufacturing sectors.

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