The financial losses from the brain drain of health professionals from Malawi

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Through institutions in the region, EQUINET has been involved since 2000 in a range of capacity building activities, from formal modular training in Masters courses, specific skills courses, student grants and mentoring. The capacity building activities in EQUINET are integrated within the existing areas of work of the network or build cross cutting skills demanded across themes by institutions in the network. The papers and reports produced in these training activities are products that are used to support or target mentoring. This report has been produced within the student grant programme and is disseminated in this context. It is not a formal EQUINET discussion or policy paper.

Executive summary

The migration of health professionals trained in Africa to developed nations has compromised health systems in Africa. The financial losses from the investment in training due to the migration from the developing nations are hardly known. This study sought to estimate the per capita financial losses that Malawi incurs through the migration of its nurses and doctors to developed nations.

The financial cost of training a doctor and an enrolled nurse-midwife was estimated by identifying upkeep costs and costs directly associated with the training. The cost of training a health professional was estimated by including fees for primary, secondary and professional training. Accepted derivation of formula as used in economic analysis was used.

Depending on the specific educational and other costs included in the estimation and interest rate used for estimating the lost investment in training a health professional who emigrates from Malawi, the financial investment losses ranged from about US$8,173 to about US$15 million per enrolled nurse-midwife, US$46,941 to about US$44 million for degree registered nurses and US$96,578 to US$79 million for medical doctors.

Developing countries are losing significant amounts of money through lost investment of health care professionals who emigrated out. There is need to quantify the amount of remittances that developing nations get in return from those who migrate.

1. Introduction

The healthcare delivery systems of many countries in Africa are unable to deliver adequate quality and quantity of services due to, among other reasons, the shortage of health professionals. In Malawi, the high maternal mortality ratio estimated at about 1120 deaths/100,000 live births have partly been blamed on the unavailability of trained midwives to deliver intra-partum care (Lema et al, 2005). There have also been concerns that the rapid scaling-up of antiretroviral therapy (ART) aimed at serving about 170,000 Malawians will be constrained by non-availability of adequately trained nurses, clinical officers and are also compromised in that there are not enough adequately qualified clinicians that can deliver care without compromising on the safety of the procedures. As a consequence, many cases requiring general care are referred to central hospitals (Steinlechner et al, 2006). The shortage of adequate health human resources in Malawi has been described as a "crisis" by some authors (Kushner et al, 2004).

The inadequate numbers and quality of health professionals in health system arise from several factors such as inadequate output from the training institutions (Namate, 1995), poor motivation and the migration of health professionals to developed nations (Eastwood et al, 2005; Dovlo, 2005). In the past few years, this issue of migration or 'brain drain' has attracted attention and has been described in the medical and health services literature. Various 'push', 'pull' and 'grab' factors have been described as fueling the losses of health professionals from Africa (Muula, 2005; Padarath et al, 2003).

While many African countries have suffered the brain drain of their health human resources to various degrees, Malawi is among the countries worst affected by shortage of human resources. Although in absolute terms, the numbers of health professionals that have out-migrated from Malawi may be surpassed by other countries, such as Kenya, South African and Zimbabwe, however as a proportion of the available health workforce, Malawi's losses are significant. For example, out of an estimated 4000 nurses active in Malawi in 2005, 453 who had been trained in Malawi were reported to be working in OECD countries (WHO, 2006). This represented 11.3% of the number of nurse active in the country. Similarly, out of about 250 doctors that had graduated from the University of Malawi-College of Medicine between 1992 and 2005, 25 (10%) were reported to be registered with the UK General Medical Council (United Kingdom General Medical Council, 2006).

In Malawi the entry requirements for nursing and paramedical training institutions is the Malawi School Certificate of Education (Ordinary Level). Primary school is for eight years, and secondary education is four years, at which time the school certificate examinations are written. Enrolled nursing and midwifery training is for three years and is offered at the Malawi College of Health Sciences and any of the eight mission nursing schools scattered in mostly rural mission hospitals.

The training of medical doctors is only provided at the College of Medicine of the University of Malawi. The history and career progression of graduates of this college are described elsewhere (Muula, 2005b; Muula et al, 2002). Candidates to be considered for medical training either enter after a one-year premedical training following their MSCE or after completing two years of a science course at Chancellor College, University of

Malawi. Some students enter medical training after A-Levels or after a science-related bachelor's degree. Currently however, most students are from the pre-medical program.

While the absolute numbers of health professionals that have emigrated from Malawi are of interest, the estimated cost of training and expected losses from the migration have not been quantified. We therefore present a financial analysis and estimate of the financial loss the country continues to experience because of out-migration of health professionals. This will possibly contribute to policy debates and health services research on the economic impact of brain drain on the African continent.

2. Methods

The cost of education was obtained through interviews with relevant administrators of the training institutions and review of records. The administrators were asked the amount of money that the institutions spent per student per year. For the Kamuzu College of Nursing especially, reported annual per capita expenditure was compared to cost estimates reported by Namate (1995). It was found that the estimated costs were not much different.

The health professional categories/cadres chosen for this study were those that normally migrated out of Malawi. Other cadres such as pharmacy and laboratory staff may migrate but not considered a major problem. These are in short supply mainly because of low production output.

One way to estimate the total cost of educating a health professional, is to include tuition at primary and secondary school and for the health professionals' training institution (e.g. nursing school, medical school). Indirect costs, though controversial were estimated as all other costs except those directly related to tuition. Indirect costs were estimated as the cost of raising a child from birth to graduation.

2.1. Loss of investment

Estimation of per capita loss was determined by calculating a future value (FV) of investment for a fixed sum of money at a particular interest rate. These methods are similar to those used by Kirigia et al (2006) and Kennedy (2006).

The FV i.e. Loss from a country through migration was estimated as:

$$FV1 = Sum \times (1+i)^{n}$$

Where:
Sum= amount invested
i= compound interest rate
n= the number of years the money is invested

(Colorado State University, 2006)

2.2. Interest rates at banks

For the purposes of this study, calculation of capital losses was based on the prevailing commercial bank rates in Malawi in May 2006. Average rates obtained from banks were as follows:

- bank lending rate (mortgage): base 27%
- savings account interest rate: 6%.

2.3. Estimated time of service abroad

Many health professionals who leave the country do so within five years of graduation. It was therefore estimated most, if they do not return, would spend about 30 years of working life in the recipient country.

3. Results

3.1. Per capita primary school costs

The cost of primary school was determined by obtaining current school fees for students at two non-government schools, a mission school and a private for profit school. Each of the schools was charging MK15,000 per term (three school terms in a year). At the prevailing exchange rate of US$1 to MK137, the total tuition per student for the whole eight years would be:

8 years x 3 terms x MK15,000=MK360,000
i.e. US$2628

This method of estimating primary education costs has been used before by Kirigia et al (2006).

3.2. Secondary school training

The cost of secondary school was estimated from averaging the cost of two schools, one private and the other mission. These schools were chosen as they were financially self-reliant, unlike government secondary schools which were heavily subsidized. Secondary school education in Malawi is for four years.

The total tuition at secondary school would sum to:

4 years x 3 terms x MK25,000= MK300,000
i.e. US$2190

3.3. Training of enrolled nurse-midwife

As stated elsewhere in this paper, the training of enrolled nurse-midwives takes place either at mission nursing schools or the Malawi College of Health Sciences and runs for three years. Tuition and boarding facilities at all the facilities is currently estimated as MK206,049 each year.

This would total:

MK206,049 x 3 years= MK618,147
i.e. US$ 4512

By just adding the total costs of primary, secondary and tertiary education, the total cost of training a nurse from primary to professional school would total:

US$ (2628 + 2190 + 4512)= US$9330

3.4. Training of a registered nurse-midwife

The Kamuzu College of Nursing (KCN) of the University of Malawi provides nursing degrees categorised as generic (degrees offered to students enrolled from straight from secondary school) and post-basic (degrees offered to enrolled nurses who have 'acceptable' O-level grades and with at least two years of service). Nurses with college three year diplomas in nursing and one year midwifery are also enrolled in degree programs to train for two years before being awarded degrees. Other offerings at the KCN that have began in the past two years are: Bachelor of Science in Advanced Midwifery and Diploma in Nursing for enrolled nurses. For the purposes of this paper, the only the cost of the generic program will be presented and discussed.

The KCN spends about US$5500 per student each year. According to Namate (1995), the cost of producing a degree nurse at the KCN was reported to range from US$21,527 to US$23,080. For the purpose of this paper we will take the lower estimate, i.e. US$21,527. A one-year midwifery course which virtually all nurses take will add the cost to reach US$26,909. The total cost of education from primary to tertiary level adds up to US$31,727.

3.5. Cost of medical training

Medical training usually starts with Premedical Training. Students in the pre-medical course at the College of Medicine are required to pay MK300,000 (US$2190) for all facilities. The premedical course is for one year.

The per capita cost of the Malawi MB BS program is MK1.4 million, i.e. US$10,219 per year. This is much higher than the average cost of other programs in some southern African countries due to the fact that with low student numbers, the per capita cost is much higher than at other institutions with large class size. Adding the tuition costs of premedical program and five years of medical school equals US$53,285. The total cost of training a medical doctor, thus including primary and secondary education = US$(2628 + 2190 + 53,285) = US$ 58,103.

3.6. Cost of raising child through pre-school age to health professional graduation

To obtain an estimate of raising a child from birth, we determined that the following assumptions be considered. The lowest paid government clerical officer earned MK8,000 (US$ 58.4) each month. Assuming 7 dependents per worker each of which shares the income equally (8 people in total), each individual would get about US$8.8 per month. For the whole year total = US$(8.8/month X 12 months)= US$105. According to the Malawi School System, an individual would start school at five years of age, with

eight years of primary school, and years of secondary, thus totaling seventeen years. To obtain a medical degree would mean another six years, thus 23 years. For nurse-midwife technicians, these are trained for three years after secondary school, i.e. a minimum of twenty years to raise a child to become a nurse. A registered nurse would normally need five years of post-secondary training; thus from birth to graduation resulting in a total of 22 years.

The estimated minimum amount to raise a child for 20 years will be:

20 x 105=US$2100

For 22 years:

22 x 105 = US$2310

For 23 years

23 x 105= US$ 2415

These estimates are likely to be gross under-estimates. If the estimated minimum cost of 'upbringing is included' in the equation, total investment for:

- a doctor = US$60,518
- an enrolled nurse-midwife = $11,430
- a registered nurse = US$34,037.

3.7. Lost investment due to migration

If the investment is assumed to be made at the time of migration, the losses of investment for both nurse and medical doctor at different bank interest rates can be obtained by using *Formula 1* below:

Formula 1

The FV i.e. Loss from a country through migration was estimated as:

FV1= Sum x (1+i) n

Where:
Sum= amount invested
i= compound interest rate
n= the number of years the money is invested

(Colorado State University, 2006)

The results are presented in *Table 1* below.

Table 1: Estimated investment losses per health professional migrated considering total cost of education from primary to tertiary education

Professional group	Principal invested (US$)	Interest Rate% /year	Number of years of service	Lost investment per single health professional (US$)
Nurse-Midwife technician	11,430	27	30	14,864,759
	11,430	6	30	65,648
	11,430	2	30	20,704
Registered Nurse-Midwife	34,037	27	30	44,265,248
	34,037	6	30	195,491
	34,037	2	30	61,653
Medical Doctor	60,518	27	30	78,703,890
	60,518	6	30	347,585
	60,518	2	30	109,619

Kirigia et al (2006) in his estimation of the cost of training health professionals in Kenya included the cost of education from primary to health professional training college. These authors did not include the cost of upbringing. Namate (1995) in the estimation of educational costs for the training registered nurses in Malawi from 1991-1994 only added the annual costs at KCN over a four year period. Not only was the cost of midwifery training included which virtually all nurses train in. Her study also was not aimed to calculate the losses in investments. *Table 2* below only presents the lost investment from the migration of each health professional, but when principal sum is just the total cost of tertiary training (thus excluding upbringing costs and costs of primary and secondary education).

Table 2: Estimated investment losses per health professional migrated considering cost of tertiary education only

Professional group	Principal invested (US$)	Interest rate% /year	Number of years of service	Lost investment per single health professional (US$)
Nurse-midwife technician	4,512	27	30	5,867,973
	4,512	6	30	25,915
	4,512	2	30	8,173
Registered nurse-midwife	23,080	27	30	30,015,628
	23,080	6	30	132,560
	23,080	2	30	46,941
Medical doctor	53,285	27	30	69,297,345
	53,285	6	30	306,042
	53,285	2	30	96,518

The above estimations however assume that the investments start to earn interest at the time the health professional graduates. However, we can also calculate compounded principal considering that a series of equal payments are made compounded

continuously by *n* periods. For example, educational costs in Year 1 of nursing training start earning interest after one year as Year 2 fees are added and both form two fees and compounded principal carried forward from year one earn interest at end of Year 2. These calculations are complex and beyond the scope of this paper.

3.8. Losses due to migration compared to national health budget

Malawi spends between 7% and 13% of its GDP towards health services. In 1998 this translated to US$123.9 million (Ministry of Health and Population, 2001). This amount could be equated to the loss of 60 medical doctors from the country or a third in the investment of all nurses that are currently working in the UK.

3.9. Societal losses

Migration results in many other losses other than finances. The health professionals that are left behind have a much higher workload, are likely to deliver low quality care as they can not spend adequate time on patients and also likely to suffer burn out. Tasks and roles that were previously identified for performance by highly skilled staff may be delegated to low cadres. An official of the Malawi Ministry of health was quoted in a newspaper as saying:

> *It's true, unskilled people are doing the job which they are not competent with. Guardians and hospital cleaners are attending to patients and doing jobs supposed to be done by a nurse.*
>
> (Nkawihe, 2006).

4. Discussion

There is increasing concern as to whether the investment in education of health professionals in a country eventually helps the society that is making the investment through provision of health services (Muula and Lau, 2004). In Malawi enrolled nurse trainees do not pay tuition and boarding fees as these are paid for fully by government. Students at the Kamuzu College of Nursing and the Malawi College of Medicine pay a student contribution of MK25,000 (US$183) each year towards their training. Many of the students also get a government for this amount. Payment of this loan once a student graduates is usually problematic.

The amount of lost investment depends on how high the interest rate is, the duration is lost years of service, the principal amount invested (which can only include professional training). If the principal amount invested is just the health professional (tertiary level) educational cost, and at a moderate interest rate of 6% per year, $25,195 worth of investment is lost for an enrolled nurse who migrate, $132, 560 for registered nurse-midwife and $306,042 for a medical doctor. We believe the 2% interest rate that the banks pay for savings account unrealistic if one wanted to invest a premium/principal amount.

If the 27% interest rate that the bank charges against their creditors, and if just the cost of tertiary education is considered, $5.9 million is lost for an enrolled nurse, $30 million for a registered nurse and $69 million for a medical doctor. The total cost of training at KCN ($23,080) and the Malawi College of Medicine ($53,285) is not much different from the cost of training Kirigia et al (2006) reported from Kenya, i.e. $25,352 and $53,285

respectively. Unlike in Kenya however where the mortgage rate was 15.64%, in Malawi, bank lending rates are almost twice that in Kenya because of the differences in national economy. As a result, when compared to Kenya, Malawi's lost investment is likely to be higher than other countries with lower interest rates.

Developing nations health care systems are losing millions of dollars per health professional who migrate to other countries. The estimated costs of migration depends to some extent on the assumptions made. If the bank lending rate which is usually higher than the saving account interest rates is used, the amount lost is usually higher than when account interests are used. This is mostly because banks charge more interest against people who borrow from them but pay out much lower interest rates. Developing nations like Malawi could be losing from about US$2 million to about US$100 million in lost investment for a doctor who leaves and served the recipient, usually developed country for 30 or more years.

Lately, there have been discussions to reimburse developing nations of lost investment in the training of health professional. If this was considered seriously as a viable alternative to the loss in investment, there will be need to estimate what developing nations have lost through the out-migration of their health professionals. Our study indicates that the amount of lost investment would vary depending on the assumptions made and the interests rates used.

5. Limitations of the study

We are unable to quantify the remittances by Malawians health professionals back home as these data are not officially available. Buchan et al (2006) and van Dalen et al (2005) have shown that many African health professionals in diaspora send back remittances to their families, although this is mostly through unofficial means. It was also not possible within the remit of this study to quantify the expenses that the British society incurs on Malawian health professionals practicing in the UK.

Interviews with students at the College of Medicine suggested that monthly out of pocket allowance was varied ranging from about US$25 to as much as US$150 per month. The costs of education estimated in this study also excludes the capital investment costs of buildings and other equipment, and training of teachers which necessary for education. The calculations assume the health professionals would spend 30 years working in a recipient nation. This may not be the case as one's working life can be terminate due to a diversity of reasons.

The estimated costs of training health professionals took into account recurrent costs only. There was no factoring in of investment in the training of lecturers and tutor, infrastructural and other capital investments.

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Equity in health *implies addressing differences in health status that are unnecessary, avoidable and unfair. In southern Africa, these typically relate to disparities across racial groups, rural/urban status, socio-economic status, gender, age and geographical region. EQUINET is primarily concerned with equity motivated interventions that seek to allocate resources preferentially to those with the worst health status (vertical equity). EQUINET seeks to understand and influence the redistribution of social and economic resources for equity oriented interventions, EQUINET also seeks to understand and inform the power and ability people (and social groups) have to make choices over health inputs and their capacity to use these choices towards health.*

EQUINET implements work in a number of areas identified as central to health equity in the region:

- Public health impacts of macroeconomic and trade policies
- Poverty, deprivation and health equity and household resources for health
- Health rights as a driving force for health equity
- Health financing and integration of deprivation into health resource allocation
- Public-private mix and subsidies in health systems
- Distribution and migration of health personnel
- Equity oriented health systems responses to HIV/AIDS and treatment access
- Governance and participation in health systems
- Monitoring health equity and supporting evidence led policy

This report is produced under a training programme as part of a skills building exercise. It does not reflect the views of EQUINET and is not a formal EQUINET discussion or policy paper.

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