

Avoiding occupationally acquired HIV infection while on medical electives abroad with special reference to Malawi

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Background

It is estimated that 'sixty to seventy per cent of British medical students (approx. 2400-3000) a year spend their electives in developing countries abroad. An elective programme can offer students a high quality of experiences involving personal, professional and clinical challenges. It can allow them to develop clinical skills whilst gaining insight into how medical procedures are undertaken abroad. It also allows students to work within unfamiliar settings and at times under adverse conditions. Although foreign electives on the whole are encouraged and have gained popularity there are ongoing risks faced by medical students and healthcare workers of which some are increasing. One such major risk factor is the possibility of acquiring HIV infection particularly in developing countries where there is a high prevalence.

It is therefore essential to be aware of these dangers and students must be educated in blood-borne virus transmission and appropriate infection control measures. Additionally, students should be updated on current guidelines for HIV post exposure prophylaxis (PEP).¹ They should have a well informed knowledge and understanding about how PEP works and its effectiveness which can vary according to circumstances as well as understanding specific risk factors that can lead to HIV acquisition.

Malawi as an example of a country where there is a potential risk

Malawi is a small country located in southeast sub-Saharan Africa. This developing country has a high population density resulting in healthcare facilities being strained. It is estimated there is around one doctor for every 50,000 people.² Since 1994, when Malawi became democratic, it has steadily become more popular for electives from Western countries. Its beautiful scenery, relative safety and a chance to make a valuable contribution allure many.

Overall it has poor health statistics with life expectancy at birth being only 49 years for males and 51 for females in large part due to a high infant mortality rate.³ A BMJ archive also states that 'prevalence of HIV in some areas is thought to be more than 30% (with a population average of 16%)'⁴ and UNICEF indicated that in 2010 there were around 930,000 people living with HIV.⁵ The numbers of cases of HIV are mainly monitored through surveillance at antenatal clinics. It is estimated that HIV prevalence in urban adults (23%) is nearly twice as high as when compared with rural adults (12.4%).⁶ A study conducted in 2004 indicated that the South of the country had almost double the number of HIV cases than the North and Central regions.⁶ These statistics mean Malawi is considered to be one of the world's HIV hyperendemic areas since its first documented case in 1982.⁶ It is thought that the majority of hospital admissions are due to HIV and its complications. The Queen Elizabeth Central Hospital (QECH) in Blantyre, the largest in Malawi, estimates its HIV prevalence among inpatients to 'range from 36.0% in the surgical wards to 70.0% in the medical wards'.⁷

As a result undergraduate elective students and health workers from overseas are now normally advised before departure on safety precautions and on the availability and use of PEP 'starter packs' in case of accidental exposure.³

In 2004 the government in Malawi launched a nationwide initiative allowing PEP availability for its own health care workers. This followed a study conducted at the QECH in 2003 showing the benefits of anti-retrovirals and PEP. Subsequently, a PEP service was set up in the Department of Medicine and is available 24 hours a day, 7 days per week.⁷ However, it has been argued that this resource should not be used by students coming from resourceful rich nations since it uses up limited local supplies of PEP.

The views of doctors in Malawi on the role of PEP are similar to those in the UK. They acknowledge its importance due to the high prevalence of HIV, particularly in hospital inpatients, and the high incidence of occupational injuries. However, awareness by healthcare workers regarding availability is much lower than in the UK. Also in Malawi a common deterrent from reporting an occupational injury and receiving PEP is the fear of being found positive and losing their job. Despite this reports of occupational injuries had risen 5-fold compared to 2003.⁷ However, expatriate elective students generally seek advice and consider PEP more frequently than local healthcare workers after an injury. While occupational injuries to elective students are similar to the UK, these occur at a much higher frequency in Malawi due to poorly implemented infection control measures, poor equipment and less supervision by a trained physician.⁸

Consequently, cumulative risk is a concern when students are repeatedly exposed to possibly HIV infected blood-body fluids.

The most common occupational injury recorded by healthcare workers in Malawi is a needle stick accounting for 76.3% of all reported injuries.⁷ Many of these involved hollow needles with a higher risk. Malawi also has higher proportion of patients with AIDS and high viraemia levels often because they have not been taking anti-retro viral therapy. As a result an injury where these patients are the potential source of infection may result in higher risk.

The types of student electives vary depending upon students interests. Rotations within different departments in the same hospital come with varying risks of HIV. There is higher exposure if students work in emergency departments, as this may involve pressurizing circumstances and in surgical and obstetric units. Some advise against student rotations in these situations and most agree students should not be performing any invasive procedures in these circumstances, in the UK such procedures would not be allowed. Research electives carry lower risks if patient contact is kept to minimum and care taken when handling samples. However, in rural areas, electives are frequently undertaken within smaller primitive settings where medicine is more generalized leading to higher risks due to, lack of supervision, poorer working conditions and lack of health and safety guidelines. PEP may not be as readily available.

The undergraduate medical curriculum in Malawi and UK differs significantly. In Malawi 4th and 5th year students provide services directly for patients – it is common practice for students to perform caesarean sections and lumbar punctures. UK students are likely to be unfamiliar with these procedures potentially leading to a higher risk of injury – it is also considered unethical to practice in this way, untrained and unqualified. Students must recognize their professional limitations and also be alert to inadvertently getting into a position where they feel under pressure, to participate in such procedures. Some medical schools advise students to clarify to their host institutions in advance that they should not be exposed into risky situations. Also travel insurance including emergency repatriation could be invalidated if students are injured assisting procedures beyond their competence.

Prevention of HIV infection and role of post-exposure prophylaxis (PEP)

The most important aspect relating to HIV protection is knowledge and awareness of how HIV infections spread. It is important that undergraduates are aware that all countries carry a potential HIV risk although not at the high-risk levels found in regions like sub-Saharan Africa. It is essential students are educated about blood-borne viruses⁹ including various ways transmission may occur, including sexual, blood-blood and blood-body fluid exposures. Such exposures may occur due to percutaneous injury but also when infected body fluids or blood comes in contact with mucous membranes or broken skin not just in a clinical environment.¹⁰ The risk of occupationally acquiring HIV from a percutaneous injury increases if the injury is deep, the needle is hollow and comes from a vein or artery or if blood is visible on the device.¹¹ It is essential medical students are taught basic infection control practices and to implement universal precautions to reduce exposure.¹²

In an event of an injury occurring the student should know how to reduce transmission by encouraging free bleeding around wound area and not abrading surrounding skin when washing with soap and water. Antiseptics may also damage local skin defences.¹¹ This information is essential to health and safety wherever students are studying and should be provided by all medical schools within the undergraduate curriculum.

In the UK if a significant occupational injury occurs with potential to transmit HIV the healthcare worker/ student, after immediate counseling and a risk assessment may be offered post HIV exposure prophylaxis (PEP).¹³ In addition, ongoing counseling and advice is readily available as standard practice including a repeat HIV test at three and six months after exposure and monitoring for side effects.¹⁰ This approach may however not be the normal practice in other countries visited by elective students.

PEP was introduced in the early 1990s. It is widely used due to the serious professional and personal implications HIV infection poses, despite there not being solid scientific evidence that it is effective in preventing infection in this situation. Similar combination multi-drug therapy is used as treatment by HIV positive patients to lower HIV viral load and raise the CD4 lymphocyte count. In the absence of trials in the PEP situation there are various options: Combivir® (zidovudine plus lamivudine) was one of the first to be used. However the Health Protection Agency's latest guidelines recommend 4 drugs for 'maximum protection; Truvada® (tenofovir and emtricitabine (FTC) plus 'Kaletra®' (lopinovir and ritonavir).¹

In order to be effective PEP should be started within 72 hours, as it is estimated that it takes 24 hours for the virus to reach local tissue and lymph nodes and around 5 days to reach peripheral blood.¹⁰ The earlier PEP is commenced the more likely it is to be effective. It is important to remember that seroconversion rates for HIV following occupational exposure without PEP are already very low: 3/1000 for percutaneous exposures and 1/1000 in mucocutaneous exposures.¹¹ This is because HIV is a RNA virus therefore it degrades quickly outside the human body.

The efficacy of PEP is still unknown as it is unethical to conduct controlled case studies. However, zidovudine alone has been shown to reduce infection risk by around 80% when used in animal experiments and in mother to child transmission studies.⁷ There are several possible reasons for PEP failure and these include; resistant HIV strains, delayed initiation, course incompleteness and exposure to a large inoculum.¹⁰ A full course of PEP should last 28 days; however the courses are not completed. One UK study indicated that only 16% of

healthcare workers who received PEP complete the full course.¹⁴ This may be due to unpleasant side effects which include: diarrhoea, malaise and nausea. Also the source patient may have been confirmed to be HIV negative after consenting to a HIV test although there is a 'window' period when a patient can be infected but seronegative.

In less developed countries PEP is often unavailable¹³ for reasons including limited resources and funding. Consequently, British medical schools frequently advise students travelling to high prevalence HIV areas to carry a PEP starter pack and know how to use it. The Health Protection Scotland website for health care professionals TRAVAX (and its companion public version 'Fit for Travel') contains a useful advice sheet for those considering carrying PEP.¹³ A 'starter pack' provides anti-virals for five days after exposure which allows students time to travel home for drug and blood test monitoring and counseling including advice on their future sexual behaviour. This approach can have implications for the local health community in the host country when local health workers who run the same HIV risks are unable to obtain PEP.

PEP is an expensive drug costing around £150 or more for a starter pack¹¹; this is a significant cost for students who already are funding their own electives. Beware that PEP bought privately may result in it being supplied to individuals who do not need it. **If students have concerns and/or are considering carrying PEP with them on their elective they must seek further advice on what drugs to take and how to use the medication, which could be from their own doctor or health centre but more likely from a local infection or tropical diseases specialist unit. This is especially important if their medical school does not provide its own special advice and counselling.**

Conclusion

This article highlights that carrying PEP starter packs should be considered by students travelling to HIV hyper-endemic areas for their electives. To date no cure for HIV has been developed therefore precautions and prevention remain the only way forward in reducing exposure of the virus when working in clinical settings. This report has reinforced the message that there are various risk factors for HIV and that education on blood borne viruses and infection control measures should be introduced early in the medical curriculum.¹⁵ Medical schools should centrally provide and coordinate advice enabling students to undertake electives safely and successfully. It is also important that students acknowledge their own responsibility in researching electives thoroughly to ensure risk factors are kept to a minimum and all hazards have been explored.¹⁶

It should be stated that potential risks during foreign electives should not deter students from travelling abroad as valuable contributions can be made.¹⁷ The wealth of experience and fulfilment gained could be an experience of a lifetime and carried throughout future medical careers.

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