

## Sexually transmitted infections among prison inmates in a rural district of Malawi

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### Abstract

As part of a comprehensive human immunodeficiency virus (HIV) prevention strategy targeting high-risk groups, sexually transmitted infection (STI) clinics are offered to all prisoners in Thyolo district, southern Malawi. Prison inmates are not, however, allowed access to condoms as it is felt that such an intervention might encourage homosexuality which is illegal in Malawi. A study was conducted between January 2000 and December 2001 in order to determine the prevalence, incidence, and patterns of STIs among male inmates of 2 prisons in this rural district. A total of 4229 inmates were entered into the study during a 2-year period. Of these, 178 (4.2%) were diagnosed with an STI. This included 83 (46%) inmates with urethral discharge, 60 (34%) with genital ulcer disease (GUD), and 35 (20%) inmates with epididymo-orchitis. Fifty (28%) STIs were considered incident cases acquired within the prisons (incidence risk 12 cases/1000 inmates/year). GUD was the most common STI in this group comprising 52% of all STI. This study shows that a considerable proportion of STIs among inmates are acquired within prison. In a setting of same-sex inmates, this suggests inter-prisoner same-sex sexual activity. The findings have implications for HIV transmission and might help in developing more rational policies on STI control and condom access within Malawi prisons.

**Keywords:** human immunodeficiency virus, sexually transmitted infections, control, prison, condom, Malawi

### Introduction

Prison inmates are at high-risk of contracting human immunodeficiency virus (HIV) while serving their sentences (DOUGLAS *et al.*, 1989; GAUGHWIN *et al.*, 1991; BREWER, 1999) and acquired immune deficiency syndrome (AIDS) is becoming a common problem in African prisons (OIP, 1998). In Malawi, although the prevalence of HIV among prison inmates is not known, AIDS is an important cause of death while serving sentences (NYIRENDA *et al.*, 1998, 2000).

In western countries, high-risk factors for HIV transmission in prisons include sexual abuse, homosexual activity, and intravenous injection of drugs. In Malawi, homosexuality, or 'unnatural offences' as it is described in the Malawi penal code, is not considered a societal norm and is currently illegal (LAWS OF MALAWI, 1969), carrying a prison sentence of at least 14 years. However, homosexual activity and sexual abuse is known to occur in Malawi prisons and might be the main method of transmission of sexually transmitted infections (STIs) and HIV (NACP, 1998; JOLOFANI & DEGABRIELE, 1999).

From late 1999, as part of a comprehensive district HIV prevention strategy targeting high-risk groups, regular STI clinics began to be offered through a mobile team to all prisoners in the Thyolo district of Malawi. This was on the basis that STIs facilitate the sexual transmission of HIV (CAMERON *et al.*, 1989; CLOTTEY & DALABETTA, 1993) and effective STI case-management would reduce the incidence of HIV (GROSSKURTH *et al.*, 1995).

Although condom use in itself is a critical measure in preventing the acquisition and transmission of STIs and HIV (NELSON *et al.*, 1996), providing access to condoms within prisons is against regulations as it is felt that such an intervention might encourage homosexual practices.

The objective of this study was to determine the prevalence, incidence and pattern of STIs among prison inmates in a rural district of Malawi.

### Methods

#### Study setting

The study was carried out in Thyolo, a rural district in southern Malawi with a population of 450 000. The district has 2 prisons located at Thyolo and Bvumbe towns, both accepting male prisoners. Inmates include convicts and remandees (those awaiting court sentences). Both prisons have limited infrastructure and space and prisoners are housed in overcrowded conditions. Due to financial limitations the diet is often poor in quality and quantity (JOLOFANI & DEGABRIELE, 1999). Water and sanitation facilities are generally inadequate and essential items such as blankets and soap are in short supply or often not available.

#### Study population and data collection

The study was conducted over a 2-year period between January 2000 and December 2001 and involved all male inmates in the 2 prisons. Prisoners were seen each Friday on a weekly basis by a mobile clinic team of district health services and the supporting medical non-governmental organization (Medecins sans Frontieres-Luxembourg). All new inmates who had been admitted to the prison during the previous week were seen (active case finding). The prison admission register was used to identify new prisoners who were admitted between the scheduled mobile clinic days. Inmates who had been in prison for longer than one week were seen if there was a problem which needed attention (passive case finding). After obtaining informed consent, all inmates underwent a medical interview and a general medical examination which included detailed screening for STIs. STIs were diagnosed and treated using national guidelines adapted from the syndrome-based approach (clinical assessment of commonly occurring group of signs and symptoms) as recommended by WHO (1991). Particular attention was paid to identifying urethral discharge (UD), genital ulcer disease (GUD), and scrotal swellings (SS) due to epididymo-orchitis. A patient was diagnosed as having UD if he had a purulent or mucoid discharge from the urethral meatus with dysuria, while GUD was defined as a genital lesion denuded of the normal epithelium (ulcer or sore). SS due to epididymo-orchitis was defined as a swollen, tender scrotum associated with fever and/or urethral discharge and in

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which strangulated inguinal hernia and torsion of the testes were excluded.

A prison side-room was made available for all medical examinations and confidentiality of data was ensured. Examinations were carried out by a team of 2 trained STI clinicians, and the same team was used throughout the course of the study. A patient card which contained details of socio-demographic and medical data was filled out for each patient and subsequently used during weekly follow-up visits. Inmates who were STI-free on initial screening, or who had an STI but were treated and declared cured (on follow-up) but still presented on a subsequent examination with a new STI were designated as having acquired the infection within the prison (new STI case). Inmates who had reported sexual intercourse within 7 d prior to initial screening and were found with an STI on examination one week later were assumed to have been in the incubation period. These cases were excluded from being considered new (or incident) cases acquired within the prisons. Provision of condoms was not included in the medical care package, as prison authorities considered this a contravention of prison rules and regulations. The prison authorities did agree to information, education and communication sessions (IEC) for inmates as well as the provision of condoms by the prison administrative officer for all inmates on discharge from the prison.

Inmates who were found to have an STI while in prison were also encouraged by the team to go for voluntary HIV counselling and testing (VCT) services which are available at the district hospital. Patients who could not be managed by the mobile team were referred to the district hospital.

This study received ethical approval as part of a package of operational research studies on tuberculosis, STI and HIV by the National Health Sciences Research Council of Malawi.

#### Statistical analysis

Prevalence was defined as the total number of existing cases of STIs detected among the total population of inmates during the 2-year study period (period prevalence). Incidence was defined as the number of new STI cases (occurring among inmates who were previously declared free of STIs) related to the total population of inmates at risk. This was expressed as incidence risk (cases per 1000 inmates) per year of the study period. Data entry and analysis was done using Epi-Info software (CDC, Atlanta, GA, USA)

#### Results

There were 4236 prisoners who were registered during the 2-year study period in the 2 prisons. Of these, 7 inmates did not want to be screened for STIs and were therefore excluded from the study. Of the 4229 male inmates involved in the study, the mean age was 28 years and the mean educational level was 6 years in school. There were 2707 (64%) inmates who were married while 1522 were either single or divorced. Of all inmates, 592 (14%) were unemployed at the time of incarceration, 1310 (31%) were unskilled workers, 1058 (25%) were farmers, 677 (16%) were involved in small-scale business, and 592 (14%) were skilled employees. The majority of inmates (79%) resided in villages.

There were 178 (4.2%) prisoners who were diagnosed with an STI. These included 83 (46%) inmates with UD, 60 (34%) inmates with GUD, and 35 (20%) inmates with SS due to epididymo-orchitis.

Fifty-six STI cases were diagnosed among inmates who were previously declared free of STIs during the 2-year study period. Six of these cases (all GUDs) had presented 7 d after the initial examination but had reported having had sexual intercourse within 7 d prior to incarceration. They were therefore assumed to have

been in the incubation period and were not considered as incident cases. Of the 50 (28%) STI cases that were considered to be incident (or new) cases acquired in prison over the 2-year period, there were 26 (52%) cases of GUD, 15 (30%) cases of UD, and 9 (18%) cases of SS. This included 29 new STI cases out of a total of 2224 inmates in the year 2000 (incidence risk, 13 cases per 1000 inmates per year) and 21 cases out of 2005 inmates in the year 2001 (incidence risk, 11 cases per 1000 inmates per year). There were 6 cases of ruptured peri-anal abscesses that had to be referred to the district hospital. These inmates were all under 20 years of age and had admitted to having had anal intercourse while in prison. Of those with an STI, 24 (14%) individuals went for VCT services of which 60% were HIV-positive.

#### Discussion

This study shows that 4.2% of male prison inmates from a rural district in Malawi had STIs and about one-third of these infections were acquired within the prison. Although the mobile clinic services are able to treat these infections, the main limitation of the current strategy is that condoms cannot be made accessible to inmates.

The National HIV prevalence in Malawi is estimated at 9%, (NACP, 1999) and HIV infection rates among STI patients range from 53–83% (KRISTENSEN, 1990). The finding that GUDs constituted a considerable proportion of STIs in the study population is of particular concern as these facilitate the acquisition and transmission of HIV by acting as ports of entry (CLOTTEY & DALABETTA, 1993).

Since over 60% of all inmates in this study were also married, there is also a direct risk of HIV transmission to spouses and therefore to their newborn babies upon release. Not being able to provide access to condoms in such a setting constitutes a serious obstacle to preventing inmates from acquiring and transmitting STI and HIV infections.

We tried to limit cases that might have been in possible incubation at the time of first STI screening, from being considered incident (or new) cases. It is however possible that some cases of GUDs caused by syphilis and lymphogranuloma venereum (which could theoretically have long incubation periods) might have presented much later. There is therefore a possibility that the proportion of GUD incident cases expressed in this study is overestimated.

Juveniles and destitute inmates are at particular risk of exchanging sexual favours with adult prisoners for food, warm clothing, or for protection (situational homosexuality). This situation is made worse by overcrowding, and dwindling prison resources in our setting. Several recommendations have been made as a part of a wider strategy to address the root causes of this activity and the associated risks for HIV transmission (JOLOFANI & DEGABRIELE, 1999). Some of the recommendations include reducing overcrowding, providing separate cells for juveniles, provision of essential items such as blankets, soap and adequate food on a regular basis, and improving the conditions of service for prison warders. It is however likely to be some time before the infrastructure or the funds for implementing these recommendations become available. In the meantime, increasing awareness among inmates, treating prevalent STIs, and provision of condoms are simple public health measures that would help to alleviate the problem of STI, including HIV transmission, in the specific setting.

The Dakar conference on HIV and AIDS in African prisons highlighted the impenetrable and insular nature of prison environments, as well as legal constraints, as being principal obstacles to improving health conditions in African prisons (OIP, 1998). Our experience on addressing health issues with the prison authorities

in Malawi has, on the contrary, been very encouraging. Through a process of continuing dialogue, prison authorities have demonstrated collaboration and a clear willingness in working with us. Malawi is also one of the few countries in Africa where tuberculosis control activities (NYANGULU *et al.*, 1997) and, now, STI control clinics are being offered within prisons in collaboration with partners and the prison authorities.

The issue of providing access to condoms within prisons is a legal one that challenges established social norms and that lies beyond the jurisdiction of prison authorities. The way forward lies not in making pedantic recommendations that challenge basic societal values, but in dialogue with authorities that will lead to cooperation. What is needed now is a pragmatic approach to bridge the current discrepancy between the reality of prison life and prison regulations which are dictated by existing laws.

Prostitution is also illegal in Malawi but prostitutes and their clients are now encouraged to use condoms. The national policy is to distribute condoms. The intention is not to encourage prostitution, but rather to prevent the spread of HIV. Such tolerance, which allows access to condoms based on the current reality in prisons, is what is urgently required.

The United Nations in 1989 affirmed that prisoners should have access to preventive and curative health services without discrimination on the grounds of their legal situation (UNITED NATIONS, 1989). Public health officials and collaborating partners have a moral and ethical role to assist prison authorities in improving the general conditions for prisoners and prison staff as well as advocate for effective change in policies.

Prison populations in Malawi currently provide a window of opportunity for the prevention of STI and HIV transmission. If this window of opportunity closes, STI and HIV transmission will continue in the prisons, more people will get infected and will eventually die of AIDS.

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## Anopheline vectors and malaria transmission in eastern Afghanistan

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### Abstract

Anopheline vectors and malaria transmission were studied in 2 river-irrigated, rice-growing districts of eastern Afghanistan from May 1995 to December 1996. Clinical malaria was monitored in 12 rural villages (population 14 538) by passive case detection at local clinics. Adult mosquitoes were collected by space-spraying of living quarters and stables and by cattle bait catches. Mosquito head-thoraces (17 255 specimens) were tested for *Plasmodium falciparum* and *P. vivax* circumsporozoite protein (CSP) using enzyme-linked immunosorbent assay. The recorded incidence of *P. vivax* and *P. falciparum* was 199 and 41 episodes per 1000 person years, respectively. Twelve species of anopheline were recorded; *Anopheles stephensi* comprised 82% and *A. culicifacies* 5%. Eight species tested positive for CSP: *A. stephensi*, *A. culicifacies*, *A. fluviatilis*, *A. annularis*, *A. pulcherrimus*, *A. maculatus*, *A. splendidus* and *A. superpictus*. Among infected mosquitoes 46% were positive for *P. falciparum*, 45% for *P. vivax* VK-247, and 9% for *P. vivax* PV-210. Estimates of the feeding rates of infective vectors on humans indicated that *A. stephensi* would contribute 76% of infective bites, *A. fluviatilis* and *A. pulcherrimus* 7% each, and *A. culicifacies* and *A. superpictus* 3% each. The overall infective vector feeding rate correlated with the *P. vivax* incidence rate in the human population. The conventional view of *A. culicifacies* being the main rural vector and *A. stephensi* important only in urban settings needs to be reconsidered in western outreaches of the Indo-Pakistan subcontinent.

**Keywords:** malaria, mosquitoes, *Anopheles stephensi*, *Anopheles culicifacies*, Afghanistan

### Introduction

The advent of enzyme-linked immunosorbent assay (ELISA) for detection of sporozoites has transformed the incrimination of vector species in areas of low-moderate malaria transmission (WIRTZ *et al.*, 1987). New species have been implicated and established vectors better understood (BEIER *et al.*, 1990; AMERASINGHE *et al.*, 1992, 1999; RUBIO-PALIS *et al.*, 1992). In Sri Lanka, for example, the predominance of *Anopheles culicifacies* in transmission has been confirmed, and species once deemed unimportant such as *A. subpictus* and *A. vagus* are now implicated (AMERASINGHE *et al.*, 1999). *A. culicifacies* has a wide geographic distribution from the Persian Gulf to northern south-east Asia, and overlaps with another important vector, *A. stephensi*, over much of this range (ZAHAR, 1990). It is often asserted that *A. culicifacies* is the main vector in rural areas whereas *A. stephensi* is more important in urban or peri-urban settings (REISEN & BOREHAM, 1982; RAO, 1984; MAHMOOD & MACDONALD, 1985; SUBBARAO, *et al.*, 1987).

Traditionally malaria has always been an important problem in Afghanistan (DHIR & RAHIM, 1957). Of the 18 species of anopheline recorded, the principal vectors are purported to be *A. superpictus*, *A. culicifacies*, *A. hyrcanus*, and *A. pulcherrimus*, all of which have yielded sporozoite-positive specimens from Afghanistan in the past (RAO, 1951; IYENGAR, 1954; DHIR & RAHIM, 1957). Changes in environmental or demographic factors, or in operational control programmes, may have species-specific effects which alter the relative importance of different vectors. This has happened twice in Afghanistan's recent past: the first during the malaria eradication era, the second during the war with the Soviet Union and its chronic aftermath. When the national programme of malaria eradication based on indoor spraying with DDT expanded coverage in the 1950s the initial results were impressive and previously uninhabitable areas in the north were able to open up for agricultural and industrial exploitation (DHIR & RAHIM, 1957). But by 1970 a change in the vector situation had become apparent: the original (at least

putative) main vector, *A. superpictus*, was virtually eliminated in the north, and replaced by the exophagic and exophilic *A. hyrcanus* and *A. pulcherrimus*, which were able to maintain transmission despite DDT spraying (ONORI *et al.*, 1975). *A. stephensi* and *A. culicifacies*, the predominant species in the east and south, developed resistance to DDT (CULLEN, 1978; ESHGHY & NUSHIN, 1978a); where necessary a change was made to malathion, with good results (ESHGHY & NUSHIN, 1978b). In problematic rice-growing areas in the north, where indoor spraying proved relatively ineffective against the exophilic species, the larvivorous fish, *Gambusia*, was deployed in rice fields with alleged success (POLEVOY, 1973; ONORI *et al.*, 1975).

After 1980, the war in Afghanistan led to a progressive breakdown of malaria control activities; eastern rural areas were depleted of population, villages partially destroyed, and irrigation systems damaged. Destruction of the health infrastructure and population displacement resulted in an upsurge of malaria in the region (KAZMI & PANDIT, 2001; ROWLAND *et al.*, 2002a, 2002b). During the last decade — despite continuing political instability — the eastern and southern parts of the country have become safe enough for many refugees to return home. Changes in demography, land quality, and water supply are suspected of affecting mosquito abundance and human-vector contact. As part of the assessment of the malaria problem, the vectors and malaria transmission rates were investigated in eastern Afghanistan.

### Methods

#### Study area

The study took place from May 1995 to December 1996 in the rural districts of Behsud and Chaprahar, near Jalalabad city, Nangahar province, eastern Afghanistan. Twelve villages participated, 6 from each district. War in the east came to an end in 1992. By the time the study commenced many refugees had returned from Pakistan, rebuilt their mud and timber houses, and repaired the irrigation systems. Families sleep outdoors during the hot summer nights, moving indoors from mid-October. The main crops are wheat in February–May, rice in June–November, vegetables, and opium poppy. The main sources of mosquito breeding are in and around river-irrigated rice fields. Rivers are snow and rain fed. The weak monsoon rains reach Nangarhar in July. Malaria is seasonal, and local

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