



## Providing a gateway to prevention and care for the most at-risk populations in Bhutan: is this being achieved?

L. Khandu,<sup>1</sup> R. Zachariah,<sup>2</sup> R. Van den Bergh,<sup>3</sup> D. Wangchuk,<sup>4</sup> N. Tshering,<sup>1</sup> D. Wangmo,<sup>5</sup>  
R. Ananthakrishnan,<sup>6</sup> T. Dorji,<sup>7</sup> S. Satyanarayana<sup>8</sup>

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**Setting:** Two free-standing urban human immunodeficiency virus (HIV) testing and counselling (HCT) centres in Bhutan offering services to the general population and targeting the most at-risk populations (MARPs).

**Objectives:** To assess the trend in testing for HIV, hepatitis B and syphilis in both the general population and MARPs, and to determine if sociodemographic and risk behaviour characteristics are associated with HIV, hepatitis B and syphilis seropositivity.

**Design:** Cross-sectional study using client records, 2009–2012.

**Results:** Of 7894 clients, 3009 (38%) were from the general population, while 4885 (62%) were from MARPs. Over the 4-year period, testing declined progressively among the general population, while it increased or remained static for MARPs. Of 4885 MARPs, seropositivity was respectively 0.7%, 1.3% and 1.2% for HIV, hepatitis B and syphilis. Female sex workers (FSWs) (relative risk [RR] 4.4,  $P = 0.03$ ) and partners of person living with HIV (RR 25.9,  $P < 0.001$ ) had a higher risk of being HIV-positive. FSWs had also a greater risk of being syphilis-positive (RR 9.1,  $P < 0.001$ ).

**Conclusion:** The increase in uptake of HCT services by MARPs is a welcome finding; however, the relatively static trends call for the introduction of community outreach approaches. The critical gateway being provided to MARPs is an 'opportunity' for the expansion of the current service package.

At the end of 2012, three decades into the HIV/AIDS (human immunodeficiency virus/acquired immune-deficiency syndrome) epidemic, approximately 35 million people were living with HIV/AIDS, another 2.3 million were newly infected, and there were an estimated 1.6 million HIV/AIDS-related deaths.<sup>1,2</sup> HIV counselling and testing (HCT) is a critical gateway for people to access HIV treatment, care and the full range of prevention options, including pre-exposure prophylaxis and microbicides. The rational design of HCT services is needed in low- and middle-income countries.

Many studies have shown the beneficial effect of introducing HCT services. Studies from Africa and Thailand have shown its effectiveness in HIV prevention and as an entry point to access care.<sup>3,4</sup> India has over 5000 standalone VCT (voluntary counselling and testing)/HCT centres and more than 1500 integrated VCTs centres with health centres.<sup>5</sup>

Bhutan is an Asian country with a low HIV prevalence, of below 0.1%.<sup>6</sup> In the context of low prevalence, most at-risk populations (MARPs) are important in the transmission dynamics of HIV and sexually transmitted infections (STIs) – the latter of which enhance HIV transmission. In Bhutan, MARPs are defined as those groups at higher risk of being infected by HIV and who play a prominent role in HIV transmission. They include groups such as female sex workers (FSW), clients of sex workers, injection drug users (IDUs), men having sex with men (MSM), transgendered individuals, partners of people living with HIV/AIDS, and individuals with multiple sex partners. MARPs are predisposed to acquiring and transmitting HIV and STIs. For example, clients can infect FSWs, who will in turn transmit the infection to other clients and from them to their sex partner. Preventing infection among MARPs has the potential to slow HIV and STI transmission to the general population, and this has been observed in Brazil, India, Kenya and Thailand.<sup>7</sup>

In Bhutan, HCT has primarily been located in health care facilities, to which MARPs have limited access due to operational, logistic and social barriers, including stigma and discrimination. To bridge this gap and to enhance general HCT access among urban populations, the Ministry of Health established free-standing HCT centres in 2006 in the country's two largest cities whereby individuals are offered a package of HIV, hepatitis B and syphilis testing. To minimise stigma and to promote an appropriate environment for MARPs, these centres were termed 'health information service centres' (HISCs).

There has been no formal assessment of whether or not this initiative has increased the uptake of HCT services by MARPs. Such information would be useful before the expansion of this initiative to other districts in the country with higher proportions of MARPs. Other countries in the region may also benefit from the lessons learnt in trying to reach out to this relatively excluded and vulnerable group through free-standing HISCs.

In two urban HISCs in Bhutan, 1) we assessed the trend in HIV, hepatitis B and syphilis testing in both the general population and MARPs, and 2) in the latter, we determined if socio-demographic and characteristics of risk behaviour were associated with HIV, hepatitis B and syphilis seropositivity in MARPs for the period 2009–2012.

### AFFILIATIONS

- 1 National HIV/AIDS & STIs Control Programme, Department of Public Health, Ministry of Health, Royal Government of Bhutan, Thimphu, Bhutan
- 2 Operational Research Unit (LuxOR), Operational Centre Brussels, Médecins Sans Frontières, Luxembourg, Luxembourg
- 3 LuxOR, Operational Centre Brussels, Médecins Sans Frontières, Brussels, Belgium
- 4 Department of Public Health, Ministry of Health, Royal Government of Bhutan, Thimphu
- 5 National HIV/AIDS Consultant (Pvt), PIE Solution, Thimphu, Bhutan
- 6 REACH, Chennai, India
- 7 Communicable Disease Division, Department of Public Health, Ministry of Health, Royal Government of Bhutan, Thimphu, Bhutan
- 8 International Union Against Tuberculosis and Lung Disease, South-East Regional Office, New Delhi, India

### CORRESPONDENCE

Lekey Khandu  
National HIV/AIDS & STIs Control Programme  
Department of Public Health  
Ministry of Health  
PO Box 726  
Kawajangsa, Thimphu, Bhutan  
Tel: (+975) 2 328 091; 328 092  
Fax: (+975) 2 336 042  
e-mail: lekeytkhandu@gmail.com

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## METHODS

### Study design

This was a cross-sectional descriptive study using standardised client records.

### Study site, setting and population

The study was conducted between March and November 2013 at two free-standing HISCs located in Bhutan's two largest cities, Thimphu and Phuntsholing. Bhutan is a landlocked country in South-East Asia, located at the eastern end of the Himalayas, with a total population of approximately 700 000.<sup>8</sup> The country has three regional referral hospitals, 31 district hospitals, 184 basic health units and 517 outreach clinics (ORCs). Bhutan has achieved and sustained primary health care coverage of over 90%.<sup>9</sup>

The HISCs became functional in 2006. The study population included retrospective data for all the clients who presented at the two HISCs between January 2009 and December 2012. This is because the client registration and recording form was revised in 2009, allowing the capture of comprehensive information about HISC activities.

### HCT services and HISCs and their package of services

Before the introduction of free-standing HISCs in 2006, HCT services were made available in an integrated manner with other health care services such as mother and child health (MCH) units. Centralised recording and reporting of quarterly VCT data was comprehensively introduced on a quarterly basis in 2009. Since then, it has aided the national programme in determining the trend of the uptake of HCT services in each district and at national level.

In addition, two free-standing HISCs were introduced in 2006 in the two major cities to better cater to the needs of MARPs. The latter were established in strategic locations to improve accessibility and to create an appropriate environment for MARPs who do not want to visit hospitals for anonymity and privacy-related reasons. These HISCs provide a comprehensive package of services, including health information and education on HIV/AIDS, STI, and reproductive health. Pre- and post-test counselling is offered, as is testing for HIV, hepatitis B and syphilis. As part of their routine activities, the HISCs also distribute condoms and mobilise stakeholders to identify condom distribution points, and an HISC outreach team provides health education and distributes condoms in bars, hotels and clubs, which are considered hotspots for HIV and STI.

Rapid HIV testing is performed using the Alere Determine™ HIV<sub>1/2</sub> rapid antibody test (Alere, Waltham, MA, USA), the World Health Organization pre-qualified test kit. The reactive samples are then referred to the Public Health Laboratory for confirmatory testing using an enzyme-linked immunosorbent assay (antibody and antigen) and Western Blot, and the Serodia test (Fujirebio Diagnostics, Malvern, PA, USA). The tests are conducted in line with the national testing algorithm and in strict observance of national safety protocols,<sup>10,11</sup> with minimum risk of pre- and post-analytical errors. As part of the package, tests for hepatitis B antigen (HBsAg) and

syphilis are also offered to the client, and the three rapid tests are run using the same sample, avoiding multiple blood draws from the client. The rapid HBsAg and syphilis tests are conducted using the HBsAg rapid kit (Atlas Link Biotech, Beijing, China) and the treponema pallidum particle agglutination assay/rapid plasma reagin/veneral disease research laboratory (TPHA/RPR/VDRL) test. There is no mechanism or system to confirm reactive cases of hepatitis; however, for syphilis, if the rapid test is performed using VDRL or RPR, the TPHA test is used for confirmation. Bhutan follows the 'test, treat and trace' policy for the effective containment and management of HBsAg and syphilis cases.

All clients visiting the HISC are registered, and basic sociodemographic information is entered into a client form by a trained counsellor. Each centre has two full-time trained male and female counsellors and one care giver. The reason for the visit is sought, followed by an assessment of risk behaviour. Counselling and testing is performed after obtaining informed consent, and results are made available within 24 h. Those found to be positive for HIV receive antiretroviral treatment (ART) (if eligible), and are managed for opportunistic infections at the referral hospitals per national guidelines.<sup>10</sup> RPR-positive individuals are treated with penicillin injections. Health education is provided for hepatitis B, but no specific medication is offered.

### Data and analysis

Information related to the study objectives were sourced from the respective client registration forms and laboratory registers, and were entered into a structured data collection tool. These records were kept in locked cabinets in all the centres. Data were then double-entered into an EpiData database by two independent data entry operators (version 3.1, EpiData Association, Odense, Denmark) and validated for consistency and reliability. Analysis was performed using EpiData software (Version 2.2.2.178, EpiData Association) and relative risk (RR) was used as a measure of association. 95% confidence intervals (CIs) were calculated, and  $P < 0.05$  was considered significant.

### Ethics approval

Ethical clearance was obtained from the Research and Ethics Board of Health Ministry of Health, Thimphu, Bhutan, and the Ethics Advisory Group of the International Union Against Tuberculosis and Lung Disease, Paris, France.

## RESULTS

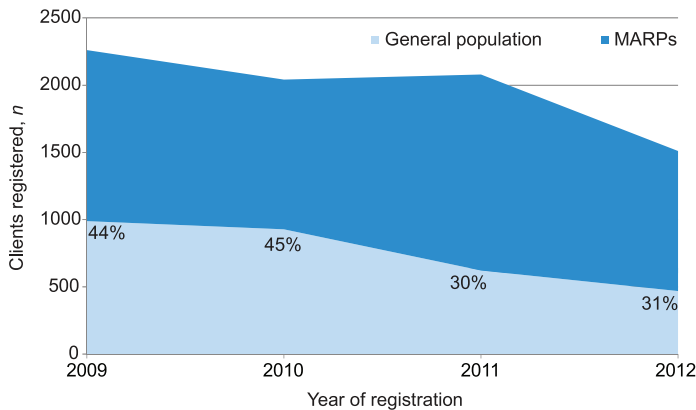
Between 2009 and 2012, a total of 8372 clients were registered at the two HISCs, of whom 478 (6%) were excluded from the analysis due to incomplete or missing data. All of the remaining 7894 registered clients were included in the analysis: 3009 (38%) were from the general population and 4885 (62%) from MARPs. All 7894 clients were registered, 7891 (99%) underwent pre-test counselling, 7892 (99%) were HIV tested and 7368 (93%) underwent post-test counselling. Two client records had missing data.

The Figure shows trends in registered clients from

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**FIGURE** Trends in total registered clients at two urban HIV counseling and testing sites in Bhutan, 2009–2012. MARP = most at-risk population; HIV = human immunodeficiency virus.

the general population and MARPs who presented for HIV, hepatitis B and syphilis testing. While client testing declined progressively among the general population attending the centres between 2009 and 2012, it increased or remained relatively stable for MARPs. Seropositivity for HIV and syphilis was higher in the MARPs group ( $P = 0.002$  and  $P = 0.04$ , respectively), while for hepatitis B it was similar ( $P = 0.99$ ) (Table 1). Among women, married and divorced individuals, FSWs and partners of people living with HIV (PLHIV) had a significantly higher risk of being HIV-positive (Table 2A). Females showed a protective effect against hepatitis B compared to males (Table 2B).

The situation for syphilis seropositivity was similar to that of HIV, except that clients of sex workers and older individuals were at higher risk (Table 2C). There was a significant inverse linear trend in syphilis seropositivity, associated with increasing educational levels ( $\chi^2$  for trend 12.1,  $P < 0.001$ ). We used trend analysis in Table 2C for variable education to show a significant linear dose-response relationship of syphilis prevalence with educational level, i.e., syphilis prevalence increased with lower levels of education.

## DISCUSSION

This study is the first of its kind in Bhutan to assess trends in testing for HIV, hepatitis B and syphilis at stand-alone urban testing

centres designed to target MARPs. The findings are encouraging in that considerable numbers of MARPs accessed the services. As expected, the prevalence of HIV and syphilis was higher in MARPs than in the general population, while the prevalence of hepatitis B was similar.

The strengths of the study are that data were directly sourced from client forms and laboratory registers, double-entered and validated, and counsellors were well trained and supervised. A limitation of the study is that data on risk group allocation were missing; these data were therefore excluded from our analysis. This highlights a weakness in the recording and reporting system that needs attention. Precise allocation of risk group and risk behaviour patterns is vital to assess risk and ensure linkage to appropriate prevention and care interventions. Furthermore, due to the low prevalence of the three diseases discussed here, statistical analysis of the positivity rates was compromised by the small sample sizes. Finally, as this study was based on routine programme data, some values were missing for most variables; however, these numbers were low, and are unlikely to have affected the statistical analysis.

A number of findings merit discussion. First, there was a progressive drop in testing among clients from the general population compared to MARPs. As the HISCs were primarily designed to target MARPs, this is a welcome finding. We do not know the specific reasons for this decline over time, although we speculate that it may be related to the withdrawal of World Bank support to outreach services. The continued attendance of clients from the general population (albeit with decreasing numbers over time) is still encouraged to reduce stigmatisation of risk groups by the community. A question to be asked is whether or not we have reached saturation of MARPs, as the numbers being tested have been relatively static in recent years. Unfortunately, we have no idea of the denominator of MARPs in our catchment area, and coverage calculations are thus not possible. Nevertheless, it is well known that a 'one size fits all' approach<sup>1,12</sup> is not appropriate for MARPs and that multiple strategies are needed to increase testing in this group. This may include mobile outreach testing in the community, drop-in testing clinics at entertainment sites and night clubs and 'moonlight testing', i.e., offering testing during working hours and on site for groups such as FSWs, truckers and taxi drivers.

Second, FSWs had a much higher probability of being both HIV- and syphilis-positive. One operational consideration could be to introduce periodic presumptive treatment in this group. Be-

**TABLE 1** Yearly trends in HIV, hepatitis B and syphilis testing from 2009 to 2012 in two stand-alone testing sites (HISC) in two cities, Thimphu and Phuentsholing, Bhutan

	2009 n (%)	2010 n (%)	2011 n (%)	2012 n (%)	Total n (%)
<b>General population</b>					
HIV-tested	989	928	623	469	3009
HIV-positive	0	4 (0.4)	1 (0.2)	0	6 (0.3)
STIs tested	958	928	623	469	2978
Hepatitis B-positive	17 (1.8)	7 (0.8)	8 (1.3)	7 (1.5)	39 (1.3)
Syphilis-positive	6 (0.6)	2 (0.2)	11 (1.8)	2 (0.4)	21 (0.7)
<b>Most at-risk population</b>					
HIV-tested	1271	1114	1456	1042	4885
HIV-positive	7 (0.6)	8 (0.7)	13 (0.9)	5 (0.5)	33 (0.7)
STIs tested	1241	1114	1456	1042	4853
Hepatitis B-positive	17 (1.4)	7 (0.6)	29 (2.0)	12 (1.2)	65 (1.3)
Syphilis-positive	24 (1.9)	10 (0.9)	16 (1.1)	9 (0.9)	59 (1.2)

HISC = health information service centre; HIV = human immunodeficiency virus; STI = sexually transmitted infection.

**TABLE 2 A)** Socio-demographic and risk group/behaviour characteristics associated with HIV positivity among most at-risk populations with recorded HIV test results ( $n = 4883$ ) at two urban stand-alone counselling and testing centres, Bhutan, 2009–2012

	Total clients registered <i>n</i>	HIV-positive <i>n</i> (%)	RR (95%CI)	<i>P</i> value
Sex				
Male	3651	19 (0.5)	—	—
Female	1231	14 (1.1)	2.3(1.1–4.4)	0.02
Not recorded	1	0	—	—
Age-group, years				
≥30	1684	13 (0.8)	0.8(0.4–2.0)	0.6
<30	3199	20 (0.6)	—	—
Marital status				
Single	1798	3 (0.2)	—	—
Married	2623	25 (1.0)	5.7 (1.7–19)	0.001
Divorced/widowed	458	5 (1.1)	6.5 (1.6–27)	0.003
Not recorded	4	0	—	—
Education (school)				
No education	18	18 (1.0)	—	—
Primary	1114	4 (0.4)	0.4 (0.1–1.2)	0.09
Secondary and tertiary	1995	11 (0.6)	0.8 (0.4–1.5)	0.5
Not recorded	17	0	—	—
Risk group/behaviour				
Multiple partners	4475	19 (0.4)	—	—
Female sex worker	107	2 (1.9)	4.4 (1.0–19)	0.03
Clients of sex workers	73	0	0.0 (inf–inf)	0.6 <0.0001
Partner of PLHIV	100	11 (11)	25.9 (12.7–53)	0.5
Others (MSM/TG/IDU)	128	1 (0.8)	1.84 (0.3–14)	—

**TABLE 2 B)** Socio-demographic and risk group/behaviour characteristics associated with hepatitis B positivity among most at-risk populations with recorded hepatitis B test results ( $n = 4268$ ) at two urban stand-alone counselling and testing centres, Bhutan, 2009–2012

	Total clients registered <i>n</i>	Hepatitis B-positive <i>n</i> (%)	RR (95%CI)	<i>P</i> value
Sex				
Male	3168	61 (1.9)	—	— 0.0003
Female	1099	4 (0.4)	0.2 (0.1–0.5)	—
Not recorded	1	0	—	—
Age-group, years				
≥30	1495	23 (1.5)	1.1 (0.7–1.6)	0.95
<30	2773	42 (1.5)	—	—
Marital status				
Single	1561	11 (0.7)	—	—
Married	2307	35 (1.5)	1.1 (0.7–1.6)	0.7
Divorced/widowed	411	13 (3.2)	0.6 (0.3–1.6)	0.3
Not recorded	2	0	—	—
Education (school)				
No education	1578	26 (1.6)	—	—
Primary	974	20 (2.1)	1.1 (0.7–1.7)	0.8
Secondary and tertiary	1703	19 (1.1)	0.8 (0.5–1.3)	0.4
Not recorded	13	0	—	—
Risk group/behaviour				
Multiple partners	3928	61 (1.6)	—	—
Female sex worker	94	0	0.0	0.2
Clients of sex workers	58	2 (3.4)	2.2 (0.6–8.9)	0.3
Partner of PLHIV	79	1 (1.3)	0.8 (0.1–60)	0.8
Others (MSM/TG/IDU)	109	1 (0.9)	1.0 (0.7–1.4)	0.8

**TABLE 2 C)** Sociodemographic and risk group/behaviour characteristics associated with hepatitis B positivity among most at-risk populations with recorded syphilis test results ( $n = 4281$ ) at two urban stand-alone counselling and testing centres, Bhutan, 2009–2012

Total	Total clients registered <i>n</i>	Syphilis-positive <i>n</i> (%)	RR (95%CI)	<i>P</i> value
<b>Sex</b>				
Male	3180	33 (1.0)	—	—
Female	1100	26 (2.4)	2.3 (1.4–3.8)	0.001
Not recorded	1	0	—	—
<b>Age-group, years</b>				
≥30	1497	35 (2.3)	2.7 (1.6–4.5)	0.0001
<30	2784	24 (0.9)	—	—
<b>Marital status</b>				
Single	1561	11 (0.7)	—	—
Married	2307	35 (1.5)	2.2 (1.1–4.2)	0.02
Divorced/widowed	411	13 (3.2)	4.5 (2.0–10.0)	0.0001
Not recorded	2	0	—	—
<b>Education (school)</b>				
No education	1581	32 (2.0)	—	—
Primary	976	16 (1.6)	0.7 (0.4–1.3)	0.3
Secondary and tertiary	1710	11 (0.6)	0.3 (0.2–0.6)	0.0004
Not recorded	14	0	—	—
<b>Risk group/behaviour</b>				
Multiple partners	3938	46 (1.2)	—	—
Female sex worker	94	10 (10.6)	9.1 (4.7–17)	<0.0001
Clients of sex workers	59	2 (3.40)	2.9 (0.7–11.7)	0.1
Partner of PLHIV	80	1 (1.30)	1.0 (0.1–7)	0.9
Others (MSM/TG/IDU)	110	0	0.7 (0.4–1.2)	0.3

\* $\chi^2$  for trend 12.1,  $P < 0.001$ .

HIV = human immunodeficiency virus; RR = relative risk; CI = confidence interval; PLHIV = people living with HIV/AIDS; MSM = men having sex with men; TG = transgender; IDU = injection drug user; AIDS = acquired immune-deficiency syndrome.

tween 2010 and 2012, there was an increase in the reported numbers of STIs, from 716 to 1946, in Bhutan,<sup>13–15</sup> supporting the potential benefit that could be gained from such treatment.<sup>16</sup>

Third, HISCs do not distribute female condoms and this is an important consideration, as MSM, transgenders and FSWs could benefit from this device.<sup>17</sup> Water- and silicon-based lubricants should also be part of the package, as this is key to the correct functioning of condoms for anal sex, particularly in MSM and transgenders.<sup>1</sup>

A meta-analysis of surveillance data in low- and middle-income countries found that MSM are 19.3 times more likely to be HIV-infected than the general population.<sup>17,18</sup> In Asia, the odds of MSM being infected with HIV are 18.7 times higher than the general population. Such evidence justifies targeted interventions for this group.<sup>19</sup>

There is also a need to increase perceived ownership and empowerment of the HISCs by MARPs, particularly FSWs, transgenders and MSM, by actively including them in activities of the centre. Five randomised controlled trials of community-level behavioural change interventions among MSM and transgenders have shown a 25% reduction in risk behaviour if opinion leaders from peer groups are actively involved in the delivery of services.<sup>20</sup> Bringing such leaders into the HISC may be a worthwhile endeavour.

Fourth, hepatitis B prevalence among MARPs and the general population was 1.3%, and may indicate the late introduction of hepatitis B vaccination into the Extended Programme of Immunization (EPI). For MARPs, a proactive strategy of vaccinating all hepatitis B-negative individuals would seem justified to avoid fur-

ther transmission.<sup>7,17</sup> It is surprising to note that women were at 80% lower risk of being hepatitis B-positive; we do not know the reasons for this finding.

Fifth, partners of PLHIV had a 25 times higher risk than the baseline group (multiple partners) of being HIV-positive. This underlines the importance of linking them to HIV/AIDS care and ART. The effectiveness of this linkage was not assessed in this study but would merit specific investigation.

In conclusion, this study focusing on MARPs shows that the HISC centres are serving their role of providing HCT as a critical gateway to prevention and care for this vulnerable and excluded group. There seems to be a clear need to expand the current package and stretch the services beyond the facility and into the community to avoid stagnation in numbers being tested.

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**Contexte :** Deux centres indépendants de dépistage et conseil pour le VIH (HCT) au Bhoutan proposant leurs services à la population générale et ciblent les plus à risque (MARP).

**Objectifs :** Evaluer la tendance des tests VIH, hépatite et syphilis dans la population générale et chez les MARP et déterminer si les caractéristiques sociodémographiques et les conduites à risque sont associées à la séropositivité pour le VIH, l'hépatite et la syphilis.

**Schéma :** Etude transversale sur les dossiers des clients, de 2009 à 2012.

**Résultats :** Sur 7894 clients, 3009 (38%) appartenaient à la population générale et 4885 (62%) aux MARP. Au cours des 4 années, les examens ont diminué pour la population générale tandis qu'ils augmentaient ou

restaient stables pour les MARP. Sur 4885 MARP, la séropositivité était de 0,7% pour le VIH, 1,3% pour l'hépatite B et 1,2% pour la syphilis. Les professionnelles du sexe (risque relatif [RR] 4,4 ;  $P = 0,03$ ) et les partenaires de personnes vivant avec le VIH (RR 25,9 ;  $P < 0,001$ ) avaient davantage de risques d'être VIH positif. Les professionnelles du sexe avaient également un risque plus élevé d'être positives pour la syphilis (RR 9,1 ;  $P < 0,001$ ).

**Conclusion :** L'augmentation de l'utilisation des services de HCT par les MARP est un résultat bienvenu, mais la tendance relativement stationnaire demande l'introduction d'approches de stratégie avancées dans les communautés. La porte d'entrée critique offerte aux MARP est une « opportunité » d'accroître le paquet de services actuels.

**Marco de referencia:** Dos centros independientes de diagnóstico y orientación de la infección por el virus de la inmunodeficiencia humana (VIH) en Bután, que prestan servicios a la población general, con una orientación especial hacia la población de más alto riesgo (MARP).

**Objetivos:** Evaluar la tendencia en la práctica de las pruebas diagnósticas del VIH, la hepatitis B y la sífilis en la población general y en los MARP y analizar si existen factores sociodemográficos y comportamentales que se asocien con la positividad del examen serológico de estas infecciones.

**Métodos:** Fue este un estudio transversal a partir de los registros de los usuarios de los centros entre el 2009 y el 2012.

**Resultados:** De los 7894 usuarios, 3009 (38%) formaban parte de la población general y 4885 (62%) pertenecían a los MARP. Durante el período de 4 años, la práctica de las pruebas diagnósticas disminuyó de manera progresiva en la población general, pero aumentó o

permaneció estable en los MARP. En las 4885 personas del grupo con mayor riesgo, la seropositividad fue 0,7% frente al VIH, 1,3% a la hepatitis B y 1,2% a la sífilis. Se observó un riesgo más alto de obtener un resultado positivo al VIH en las mujeres profesionales del sexo (riesgo relativo [RR] 4,4;  $P = 0,03$ ) y en las parejas de las personas resultados positivos a la serología del VIH (RR 25,9;  $P < 0,001$ ). Las profesionales del sexo exhibieron un mayor riesgo de obtener una serología positiva de la sífilis (RR 9,1;  $P < 0,001$ ).

**Conclusión:** El aumento de la utilización de los servicios de diagnóstico y orientación del VIH por parte de las poblaciones con más alto riesgo constituye una observación afortunada, pero la estabilización de las tendencias invita a introducir estrategias de extensión a la comunidad. La pasarela crucial que se está ofreciendo a la población en mayor riesgo de contraer estas enfermedades representa una 'oportunidad' de difusión del conjunto de servicios que se prestan en la actualidad.