

CHANGES IN STI SERVICES FOLLOWING A COMMUNITY BASED STI-INTERVENTION PROJECT IN CAMBODIA

Nigel O'Farrell¹, Phal Sano², Seng Sopheap², Lon Say Heng², Ly Penh Sun²,
Mean Chhi Vun², Knut Fylkesnes³ and Peter Godwin²

¹Pasteur Suite, Ealing Hospital, London, and London School of Hygiene and Tropical Medicine; ²National Center for HIV/AIDS, Dermatology and STDs (NCHADS), Ministry of Health, Phnom Penh, Cambodia; ³Center for International Health, University of Bergen, Norway

Abstract. The aim of this study was to assess changes in sexually transmitted infections (STI) related care following a STI project with a particular focus on registered brothel-based (direct) female sex workers (DFSWs) in four border provinces of Cambodia. A survey of health care facilities providing STI care was undertaken and the results compared with a baseline survey done two years previously. The main components of the project were: renovation of the STI clinics, STI training, formation of mobile teams, provision of STI drugs, and the introduction of basic laboratory tests at STI clinics. Interviews were held with health care providers and STI patients and a manual check was made of the STI register and special forms for DFSWs. Clinical management of STI cases was assessed for DFSWs, women with vaginal discharge and men with urethral discharge. Advice given to clients about condom use, partner notification and STI education was assessed and availability of STI drugs was reviewed. STI clinic attendance by DFSWs each month increased from 72% (296/412) to 93% (459/496). The proportion of DFSWs diagnosed with presumed STIs decreased from 86.5% (256/296) to 25.5% (117/459) and cervicitis from 32.8% (135/412) to 12.6% (58/459). The percentage of men attending STI clinics decreased from 26.9% (251/933) to 9.4% (102/1,080). The proportion of presumed STI cases/all cases attending health centers decreased from 7.0% (934/13,177) to 4.3% (739/17,224). The introduction of laboratory tests coincided with a marked reduction in DFSWs diagnosed with cervicitis. Further validation studies are required to determine whether this reduction was accompanied by a real decrease in gonorrhoea and chlamydia.

INTRODUCTION

The extent of the spread of human immunodeficiency virus (HIV) in Cambodia makes it one of the worst affected countries in Asia (UNAIDS/WHO, 2006). Particularly high HIV rates are found in female sex workers (FSW). In 2003, 21% of direct (brothel-based) FSW (DFSW) and 12% of indirect (non-brothel-

based) FSW (IFSW) tested HIV positive (NCHADS, 2003a). High STI rates were also identified initially in a 1996 survey with prevalences in DFSW of gonorrhoea of 35% and chlamydia in 22% although these had reduced to 14% and 12%, respectively by 2001 (Ryan *et al*, 1998; NCHADS, 2001). However, a recent survey in 2005 showed similar levels to 2001 with prevalences of gonorrhoea of 13% and chlamydia of 14% (NCHADS *et al*, 2005). These high STI levels have prevailed despite a well established 100% condom use campaign targeting DFSWs that started in the late 1990's (WHO, 2003). An essential component of this program has been high quality

Correspondence: Dr Nigel O'Farrell, Pasteur Suite, Ealing Hospital, Uxbridge Road, London UB1 3HW, UK.

Tel: 44 208 967 5746/5760; Fax: 44 208 967 5677
E-mail: nigel.o'farrell@eht.nhs.uk, nigel.ofarrell@lshtm.ac.uk

STI services for DFSW with a focus on high risk and vulnerable groups (Saphonn *et al*, 2004; Godwin *et al*, 2006).

The STI-related activities described in this report were initiated as part of a larger community project to limit HIV in Cambodia, Lao PDR and Vietnam (www.jfpr-hiv.org). In Cambodia the project was implemented in 4 border provinces with the aim of reducing STIs in FSWs and improving STI services in the general population. An initial project baseline survey was done in 2002 (Sano *et al*, 2004). The aim of this study was to compare the baseline results of the survey in 2002 to evaluate STI case management with this study in 2004, to both assess changes brought about by the project and identify further measures to improve STI control.

MATERIALS AND METHODS

The main objective of the study was to detect differences in the quality of STI services following the intervention through assessment of the following:

1) Assess the strengths and weaknesses in the availability of STI and reproductive tract infection management and identify the proportion of registered DFSWs attending as a part of the 100% condom use campaign among sex establishments in 4 border provinces: Battambang, Svay Rieng, Prey Veng and Koh Kong.

2) Assess the clinical management of vaginal discharge and cervicitis in women and urethral discharge in men through review of clinic records and adherence to National STI guidelines.

3) Assess the proportion of health facility attendees reporting with STI complaints that receive advice about condom use and partner notification as assessed during an exit survey.

4) Assess the support components for

STI management, in particular, the availability of STI drugs and condom supply through review of clinic supply logs.

Data collection

Data were collected in November 2004 at the same 6 STI clinics and the same 25 health centers with an integrated STI service as collected in 2002. Data were also collected at in 7 clinics and 6 health centers without an integrated STI service (Sano *et al*, 2004). The following methods of data collection were used: 1) documentary method by checking the STI register, the standard medical history form in STI clinics that were completed whenever DFSWs registered under the 100% condom use program attend, and the consultation record book in the health center that records total attendances; 2) semi-structured interviews with healthcare managers and providers; 3) observation of the performance of the health center with an individual patient. Questions were asked about the various aspects of STI-related knowledge and exposure to a condom demonstration at a STI clinic. Data were collected in a similar manner to that in 2002 and included 1) a national interview team of 6 interviewers from the National Center for AIDS, Dermatology and STDs (NCHADS); 4 from the STI unit (2 groups in alternation) and 2 from the technical bureau; 2) two provincial coordinators per province for the field survey.

Interviews were conducted with the following 1) STI service supporters: four provincial AIDS office (PAO) managers, 11 operational district (OD) staff responsible for drugs, 2) STI care providers: six STI clinic managers, 11 reproductive health (RH) staff working in the gynecology ward and 32 health center (HC) staff, 3) 44 STI clients selected by convenience sampling during the assessment visit for total of 108 interviewees. Some of the staff may have been included in the first survey but this was very unlikely for the STI clients. Informed verbal consent was obtained from all subjects. Six questionnaires were developed

for the following groups: PAO, STI clinic manager, OD chief, RH staff, HC staff responsible for STIs and STI clients. No interviewee refused study participation.

What was implemented?

The main components of the project were as follows: renovation and re-equipping of STI clinics, STI training and re-training of health care workers from both STI clinics and other health centers, provision of STI drugs, reagents and other consumables, formation of mobile STI teams, advocacy meetings for local authorities, staff salary supplements and supervision. In addition, FSW-specific components comprised local promotion campaigns and events, information, education and communication materials and promotion of the 100% condom use program.

Laboratory services were introduced at the STI clinics. This involved the use of wet mount microscopy for the detection of *Trichomonas vaginalis*, clue cells and yeast, a Gram's stain for vaginal discharge specimens to identify candida infections and clue cells, a methylene blue stain of cervical secretions for the detection of white cells ≥ 10 per high power field and a rapid plasma reagin test for syphilis. Previously the criteria for diagnosing cervicitis (covering both gonorrhoea and chlamydia infections) was comprised one or more of the following: yellow discharge from the cervix, cervical erosion or bleeding, yellow secretions on cervical swab or deep pain on bimanual examination. The detection of white cells ≥ 10 per high power field from a cervical smear was introduced as an additional single diagnostic indicator for the second survey. No swab tests were done for men. In health centers without STI care, no STI tests were carried out but women with vaginal discharge were treated for *Candida* and bacterial vaginosis only.

The study protocol and questionnaires were reviewed and approved by the Ministry of Health of Cambodia and implemented by

NCHADS.

Statistical analysis

Microsoft Excel was used for data entry and comparison between proportions was done using the chi-square test. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

STI clinics

The overall numbers of patients increased by 15.8% from 933 to 1,080 (Table 1). Women attending the program increased from 38% (352) to 42% (454), $p = 0.049$ whilst the number of men decreased from 26.9% (251) to 9.4% (102), $p < 0.001$. The number of FSW attending overall increased from 35.0% (330) to 49.0% (529), $p < 0.001$ and registered DFSW increased from 71.8% (296) to 93% (459), $p < 0.001$.

Presumed STIs in attendees, that is cases diagnosed syndromically or through a risk-based algorithm, decreased significantly in FSW from 86.5% (296) to 25.5% (117), $p < 0.001$. This reflects a significant reduction in those diagnosed with cervicitis as the proportion of cervicitis cases in those diagnosed with a STI was similar in both surveys, whilst the percentage of cervicitis cases decreased from 32.8% (135/412) in 2002 to 12.6% (58/459) in 2004.

The quality of care decreased slightly between 2002 and 2004 but this was not statistically significant (Table 1). In 2002 all urethritis cases were diagnosed and treated correctly whilst in 2004 93% (80/86) were diagnosed correctly and 95.3% (82/86) were treated correctly. The proportion of cases diagnosed correctly per protocol as cervicitis decreased from 99.3% (134/135) to 93.1% (54/58) though all were treated correctly.

Other health centers

In Health Centers with STI care (Table 2), all presumed STI cases decreased from 7.0%

Table 1
 Female sex worker attendances, STI diagnoses, and treatment in 6 provincial STI clinics in 2002 and 2004.

STI attendances, diagnoses and treatment	Year		p-value
	2002	2004	
Average monthly attendances in last 3 months			
Total attendances (men and women)	933	1,080	
Females in general population	352 (38%)	454 (42%)	0.049
Men	251 (26.9%)	102 (9.4%)	<0.001
Sex workers	330 (35%)	529 (49%)	<0.001
All new STI cases/Total attendances last month	345/933 (37%)	455/1,080 (42.1%)	0.018
Urethral discharge/ All STI cases in last month	81/345 (23.5%)	86/455 (18.9%)	0.115
Urethral discharge diagnosed correctly	81/81 (100%)	80/86 (93.0%)	0.825
Urethral discharge treated correctly	81/81 (100%)	82/86 (95.3%)	0.912
Registered female sex workers	412	496	
Cases in registered female sex workers in last month			
Attended for check-up	296/412 (71.8%)	459/496 (93%)	<0.001
STI cases in FSWs /FSWs visiting for check-up	256/296 (86.5%)	117/459 (25.5%)	<0.001
STI cases in FSWs/STI cases in FSWs visiting for check-up	93/256 (36.3%)	48/117 (41%)	0.385
Cervicitis cases in FSWs/ STI cases in FSWs visiting for check-up	135/256 (52.7%)	58/117 (49.6%)	0.571
Cervicitis cases in FSWs in first visit / STI cases in FSWs visiting for check-up	61/256 (23.8%)	27/117 (23.1%)	0.874
Cervicitis cases in FSWs diagnosed correctly	134/135 (99.3%)	54/58 (93.1%)	0.822
Cervicitis cases in FSWs treated correctly	134/134 (100%)	54/54 (100%)	1.0

Table 2
STI attendances at health centers with and without STI care in 2002 and 2004 in the last month.

STI issue	Health centers with STI service		Health centers without STI service		p-value
	2002 (n=25)	2004 (n=26)	2002 (n=7)	2004 (n=6)	
STI cases/Total clients for all conditions	934/13,177 (7.0%)	739/17,224 (4.3%)	286/3,253 (8.9%)	229/3,170 (7.2%)	0.021
New STI cases/Total new clients for all conditions	763/10,293 (7.4%)	575/12,427 (4.6%)	205/2,896 (7.1%)	140/2,686 (5.2%)	0.004
Follow-up STI cases/Total follow-up clients that visited HCs for all conditions	171/2,884 (5.6%)	164/4,167 (3.9%)	81/357 (22.7%)	89/484 (18.4%)	0.125
Female STI cases/Total STI cases that visited HC	701/934 (75.1%)	624/739 (84.4%)	234/286 (81.8%)	227/229 (99.1%)	<0.001
New female STI cases/Total new female STI cases that visited HC	552/701 (78.7%)	482/575 (83.8%)	155/234 (66.2%)	138/140 (98.6%)	<0.001
New vaginal discharge cases/Total new female STI cases	469/552 (85%)	435/482 (90.2%)	142/155 (91.6%)	126/138 (91.3%)	0.925
New cases of cervicitis/Total new cases of vaginal discharge	305/469 (65%)	271/435 (62.2%)	74/142 (52.1%)	59/126 (46.7%)	0.388
New urethral discharge cases/Total new STI cases that visited HC	137/763 (18%)	74/575 (12.9%)	39/205 (19%)	2/140 (1.4%)	<0.001
New cases of cervicitis in vaginal discharge diagnosed correctly/Total new cases of cervicitis	144/305 (47.2%)	174/271 (64.2%)			<0.001
New cases of cervicitis in vaginal discharge treated correctly/Total new cases of cervicitis diagnosed correctly	127/144 (88.2%)	146/174 (83.9%)			0.275
Urethral discharge cases diagnosed correctly	82/137 (59.9%)	72/74 (97.3%)			0.030
Urethral discharge cases treated correctly	54/82 (65.8%)	67/72 (93.1%)			0.182

(934/13,177) in 2002 to 4.3% (739/17,224) ($p < 0.001$) in 2004. Similar significant decreases were also seen in both new (first visit) and follow-up cases. Overall there were significant increases in all female and new female presumed STI cases and the proportion of vaginal discharge cases/all STI cases in women. New cases of cervicitis in those with vaginal discharge diagnosed correctly/total new cervicitis cases, increased significantly. Urethral discharge cases decreased significantly from 18.0% (137/763) to 12.9% (74/575), ($p = 0.012$). There was a reduction in the number of health centers working in both the morning and afternoon (66% to 33%).

In health centers without STI care, there were significant decreases in both all and new presumed STI cases (Table 2) whilst all female and new female STI cases increased significantly. Urethral discharge cases decreased significantly from 19% (39/205) to 1.4% (2/140) ($p < 0.001$).

Drug stock outs, defined as out of stock for longer than 1 week in the last 6 months, were reported in 12/25 of Health Centers with an integrated STI service in 2004 compared with 18/25 in 2002.

Exit survey

In STI clinics (Table 3), the proportion of subjects with a correct knowledge of HIV transmission modes and prevention methods

increased significantly from 35.1% and 46%, respectively, to 100% in both, as did those witnessing a condom demonstration.

In health centers with integrated services, all the parameters of STI-related knowledge increased, except for partner notification which remained about the same. Knowledge of HIV transmission modes and treatment compliance increased significantly.

DISCUSSION

Coverage of registered DFSW increased from 72% (296/412) to 93% (459/496). This high coverage was facilitated by the efficient implementation of the 100% condom use program that targets registered FSWs. However, this improvement was also associated with a significant decrease in the number of cervicitis cases diagnosed from 32.8% (135/412) to 12.6% (58/459) following the introduction of basic STI laboratory tests. Whilst our survey did not undertake molecular STI testing it is interesting to note that in the National STI survey a few months later, the respective prevalences of gonorrhoea and/or chlamydia in DFSWs in two of the four provinces covered was 10% in Prey Veng and 25% in Battambang (Guy Morineau, personal communication) whilst the number of cervicitis cases in FSW in these provinces were 19.3% and 3.8%, respectively (data not shown). This finding may be relevant in explaining the

Table 3
STI education prevention and care in STI clients assessed at exit interview in 2002 and 2004.

STI-related knowledge, and exposure to condom demonstration in STI clients	STI Clinics			Health centers with integrated STI service		
	2002 <i>N</i> = 37	2004 <i>N</i> = 13	<i>p</i> -value	2002 <i>N</i> = 7	2004 <i>N</i> = 25	<i>p</i> -value
STI transmission mode	13 (35.1%)	13 (100%)	<0.001	0 (0%)	14 (56%)	0.010
Prevention methods	17 (46%)	13 (100%)	0.001	1 (16.7%)	12 (48%)	0.195
Compliance	35 (94.6%)	13 (100%)	1.000	5 (71.4%)	25 (100%)	0.042
Partner notification	24 (64.9%)	11 (85%)	0.294	4 (57.1%)	14 (56%)	1.000
Condom demonstration	16 (43.2%)	11 (85%)	0.012	1 (14.4%)	15 (60%)	0.083

lack of change in national STI prevalence rates recently, in that the decrease in cases diagnosed as cervicitis, according to the algorithm using basic laboratory results, resulted in a decrease in sensitivity and a higher proportion of true gonorrhea/chlamydia cases going untreated. Our survey also showed that the mean age of DFSWs appears to be increasing. In 2001 the mean age was 21.6 but by 2005, this had increased to 25 (NCHADS, 2001; NCHADS *et al*, 2006). This increase in age would be expected to be associated with a lower rate of cervical STIs, given that the prevalence of cervical ectopy, a complication for gonorrhea and chlamydia, tends to be lower in this older age-group.

Overall there was a significant reduction in the proportion of presumed STI cases amongst all cases attending health centers in this community when compared with the baseline survey. The significant reduction in the proportion of male attendees at the clinics suggests a real decrease in the community burden of STIs. The last Cambodian Behavioral Surveillance Survey showed a consistency in health care seeking behavior among men with urethral discharge in the military, police and taxi drivers; 18-21% attended public clinics (NCHADS, 2003b). During the project there were no apparent changes in the provision of STI care reported by the PAO managers involving other providers, such as pharmacies, private doctors or traditional healers. This is particularly relevant given the important of sexual bridging of Cambodian men in spread STIs and HIV and the cost effectiveness of male interventions (Gorbach *et al*, 2000; Godwin *et al*, 2005).

It is unclear why there was an increase in women with STI attending the clinics. It is not uncommon for women in Cambodia to complain of vaginal discharge even though they may be at low risk for STIs. We believe that more women probably attended the STI clinics because of the good reputation of the clinics.

Drug stock-outs were fewer in 2004 than 2002. This improvement was mainly due to a new focus on drug-supply logistics with additional qualified personnel which has enabled the roll-out of antiretrovirals in the country.

As assessed by the exit survey, STI education and knowledge was good although the number of STI clients was small. There were some difficulties with contact tracing but these may reflect the low predictive values for gonorrhea and chlamydia amongst partners with vaginal discharge.

One factor introduced to Cambodia was salary supplements for STI clinic staff and some provincial AIDS office staff to facilitate improved quality of care. This model has been expanded and a full performance-based salary incentive scheme supported and sustained by DFID has been developed with the eventual aim of the government being to take over these payments (Viney, 2007).

A weakness of the project was its limited evaluation of IFSW, a large group that may have a high incidence of STIs (Kim *et al*, 2005; Vandepitte *et al*, 2006). The outreach teams did see many IFSW in the field and encouraged them to visit the STI clinics. Overall, the project saw 13,673 FSW and 20,220 from the general population (NCHADS, 2005).

This study also showed that whilst monitoring some process indicators may be an effective way of assessing interventions, actual measurement of STI levels is still required to help interpret changes in STI-related attendances. Treatment of cervicitis for all first-time attendees is appropriate given the high mobility of FSW in Cambodia (Sopheab *et al*, 2006) and the high risk for STI associated with young age. One way of tackling these high rates of STIs may be the introduction of periodic presumptive treatment (PPT), at least for the short term. This method has clear advantages over using Gram's stain and basic microscopy (Thuong *et al*, 2007) which may not

be available or performed poorly; PPT treatment in high-risk groups may be a particularly cost effective STI control strategy in Cambodia (O'Farrell *et al*, 2006).

Our study sheds doubt on the effectiveness of basic laboratory tests employed to diagnose cervicitis due to gonorrhoea and/or chlamydia. Further monitoring should focus on the proportion of FSW treated for cervicitis at each attendance. Supervision should be intensified if diagnostic criteria change (O'Farrell, 2007) and future surveys should be undertaken using STI molecular diagnostic techniques.

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