Uptake of provider-initiated HIV and syphilis testing among Heterosexual STD Clinic attendees in Southern China: Results from a Cross-sectional Study

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Abstract

Background Provider-initiated HIV and syphilis testing and counseling (PITC) services are important components of HIV and syphilis prevention programs. However, PITC guidelines have neither been formalized nor widely implemented in China. Limited studies conducted to identify the barriers to offering PITC services from sexually transmitted diseases (STD) clinic attendees' perspective. We conducted a cross-sectional survey on heterosexual STD clinic attendees to evaluate this in China.

Methods A cross-sectional survey was conducted in 2016 in Southern China. Participants completed a validated questionnaire including social-demographic information, reasons for not conducting HIV and syphilis testing, and HIV and STD infection history. In this study, we limited the participants as individuals who self-identified as heterosexual.

Results A total of 1943 participants were recruited in this study. Among those participants, 60.6% (1177/1943) and 74.3% (1443/1943) conducted HIV testing and syphilis testing during the study, respectively. Of whom, 2.2% (26/1177) and 21.5% (310/1443) are found to be HIV-positive and syphilis-positive, respectively. The most common barrier to HIV and syphilis testing is a lack of awareness of HIV and syphilis infection. Condom use in the last sexual act, having paid sex during the last 6 months, and receiving HIV and STD related knowledge were positively associated with uptake of both HIV and syphilis testing.

Conclusions This study highlights the need and importance of promoting provider-initiated HIV and syphilis testing and counseling services in China. Future studies on exploring innovative methods to improve the knowledge and awareness of HIV and syphilis infection among STD clinic attendees is warranted.

Introduction

Sexually transmitted human immunodeficiency virus (HIV) infections have become a public health concern globally. An estimated 85% of HIV infections are transmitted through heterosexual intercourse worldwide[1]. In China, heterosexual transmission has been reported to account for 69.9% of HIV infections[2]. Integration of HIV services into routine STD clinical care has been proven useful for expanding HIV testing and treatment among populations at risk for both infections in many low- and middle- income countries[3–5].

In 2014, considering the high burden of HIV-syphilis co-infection and syphilis epidemic, the Chinese centers for disease control and prevention issued provider-initiated HIV/syphilis testing and counseling (PITC) guideline to increase provider HIV/syphilis testing in China[6]. However, promoting physicians providing HIV and syphilis testing actively to all patients presenting for STD medical care is no small task due to the high workload of clinicians in China[7]. To address this challenge, several studies suggested strategies of pay-for-performance, strengthened training and propaganda among physicians to encourage provider HIV/syphilis testing[6, 8]. Although a good increase of HIV/syphilis testing rate

among STD clinic attendees was observed with applying of these strategies, the rates of HIV testing [6] (56.7%) and syphilis testing [6](68.6%) were still much lower than the target of 90% of people with HIV and syphilis to know their status by the year 2020[9, 10]. To date, limited studies conducted to analyze the factors associated with uptake of HIV/syphilis testing from STD clinic attendee's perspective in the context of PITC program[11–13].

In light of the high proportions (99.1%) of heterosexual population among STD clinic attendees[13], this study was conducted among heterosexual STD clinic attendees to analyze determinants of syphilis and HIV test uptake from patients' perspective in China to inform a better model for PITC implementation.

Methods

Participants and procedures

We conducted a cross-sectional study among heterosexual STD clinic attendees in seven public STD clinics in two cities in southern China from July 2016 to December 2016. The types of public STD clinics included three clinics in the general hospital, two clinics in the maternal-child health center and two clinics in the local STD prevention center. For participants who visited the seven STD clinics, physicians would actively recommend them to conduct HIV and syphilis testing during the consultation process. Participants meeting with the following inclusion criteria were asked to fill out a questionnaire with the help of a trained research assistant: self-identified heterosexual, engaged in vaginal or anal sex with an opposite-sex partner in the past 12 months, at least 18 years of age, and willing to provide written informed consent. After completing the questionnaire, for participants who were willing to uptake HIV and syphilis testing, approximately 10 ml of blood would be drawn by a trained nurse for HIV and syphilis testing.

Measures

Social-demographic and behavioral variables

Socio-demographic information included: age, gender, marital status, education, and monthly income. Behavioral variables included condom use in the last sexual act, frequency of condom use in the last 6 months, and commercial sex behavior in the last 6 months.

HIV and syphilis testing and related medical services variables

HIV and syphilis testing and related medical services included acceptance and uptake of HIV and syphilis testing during this visiting, reasons for not conducting HIV and syphilis testing at this time, HIV and STD infection history, education on HIV and STDs related knowledge in the past 12 months.

Laboratory testing

The Enzyme-linked Immunoassay (ELISA) test (Lizhu Biotech Inc, Zhuhai, China) was used for HIV screening and Western blot assay test (HIV Blot 2.2 WB, Wantai Biotech Inc, Beijing, China) was used for HIV test confirmation. The rapid plasma regains (RPR) test (Lizhu Biotech Inc, Zhuhai, China) and Treponema pallidum particle agglutination (TPPA, Rongsheng Biotech Inc, Shanghai, China) were used for syphilis screening and confirmation, respectively.

Statistical analysis

All data were double-entered with logic checks using EpiData3.0. Descriptive analysis was performed to describe socio-demographics, sexual behaviors, and HIV/syphilis testing. Univariate and multivariable logistic regressions were conducted to explore factors associated with uptake of HIV and syphilis testing as well as HIV and syphilis infection. In the multivariable model, we adjusted for age (continuous), gender, marital status, educational attainment, and monthly income. All data were analyzed using SAS 9.4 (SAS Int. Cary, NC, USA).

Results

Study participants

A total of 1943 participants were recruited in this study. Of those participants, the majority were male (50.6%, 983/1943) and married (79.6%, 1546/1943). Approximate one-third of participants (40.1%, 780/1943) were between 25 and 35 years old, had a middle school degree (40.1%, 780/1943), and had an annual income between US $5001 and $9000. 16.1% (313/1943) had ever infected with STD. Most participants (70.2%, 1364/1943) used condoms sometimes during the last 6 months. Nearly one-third (35.3%, 685/1943) used condom in the last sexual act. One-tenth (12.9%, 250/1943) had paid sex during the last 6 months, of whom half (49.6%, 124/250) used condoms in the last paid sexual act. (***Table1***).

The testing rate and prevalence of HIV and syphilis

Of the 1943 participants, 60.6% (1177/1943) participants accepted and conducted HIV testing, and 2.2% (26/1177) were found to be HIV-positive. 74.3% (1443/1943) participants accepted and conducted syphilis testing and 21.5% (310/1443) were positive. The most common barrier to testing is that they do not think it is necessary to take the test (HIV: 71.5%, 548/766; syphilis: 67.6%, 338/500), followed by the having once taken a test (HIV: 14.6%, 112/766; syphilis: 17.2%, 86/500). Around half of the individuals (56.9%, 1105/1943) were tested for HIV and syphilis at the same time, and 0.54% (6/1105) was co-infected with both HIV and syphilis (***Table1 and Table2***).

Factors associated with HIV and syphilis testing uptake

After adjusted for age, gender, ethnic, education level, marital status and monthly income, multivariable logistic regression analysis indicated that condom use in the last sexual encounter (adjusted Odds Ratio (aOR): 3.25, 95%CI: 2.61-4.05), having paid sex during the last 6 months (aOR:3.19, 95%CI: 2.24 -4.56),

condom use during the last paid sexual act (aOR:3.27, 95%CI: 1.81-5.92), receiving HIV and STD related knowledge (aOR:1.94, 95%CI: 1.58-2.40) were positively associated with HIV testing uptake. ***(Table 3)***.

The participants who ever infected STD (aOR=1.78, 95%CI: 1.29-2.44), used condom in the last sexual encounter (aOR=2.23, 95%CI: 1.76-2.84), had paid sex during the last 6 months (aOR=1.84, 95%CI: 1.27-2.67) and received HIV and STD related knowledge (aOR=2.91,95%CI: 2.25–3.77) were more likely to accept syphilis testing. ***(Table 3)***

Factors associated with HIV and syphilis infection

After adjusted for age, gender, ethnicity, education level, marital status and monthly income, multivariable logistic regression analysis indicated that participants who had paid sex during the last 6 months (aOR=2.00, 95%CI: 1.24 -3.12) were more likely to be infected with HIV. ***(Table 4)***.

The participants who had ever infected with STD (aOR=5.31, 95%CI: 3.93-7.18), not used condom in the last sexual encounter (aOR=1.75, 95%CI: 1.29-2.39) and not used condom in the last paid sexual act (aOR=2.69, 95%CI: 1.26–5.76) were positively correlated with syphilis infection. ***(Table 4)***.

Discussion

PITC was a key component of HIV and syphilis prevention programs[14]. Although many PITC successful pilots have been implemented in China, PITC guidelines have neither been formalized nor widely implemented. This study extended the existing literature by focusing on heterosexual STD clinic attendees and analyzing barriers to acceptance of provider-initiated HIV and syphilis testing service from patients' perspective. Data suggest that many barriers still exist preventing patients from accepting PITC services in China. Findings from this study provide insights for the future implementation of PITC services among STD clinic attendees in China.

We found a low acceptance of provider-initiated HIV and syphilis testing services among heterosexual STD clinic attendees in China. This rate is much lower than previously reported in Zambia[15], Botswana [16] and South Africa[17]. Whereas other studies showed that social stigma against HIV and STD[18], fear of testing[19] and lack of testing information[20] are main contributors of limiting HIV and syphilis testing, our study found that the most important barriers in this sample of Chinese heterosexual STD clinic attendees were a perceived low prevalence of HIV and syphilis. This highlights the importance of improving knowledge and awareness of HIV and syphilis infection among heterosexual STD clinic attendees on increasing the acceptance of PITC services. Internet-based interventions, such as through mobile communication apps, have been well developed and widely implemented on increasing health sexual knowledge and behaviors globally [21]. Given the high Internet accessibility in China, future strategies explored on improving acceptability of PITC services through Internet are warranted.

Our study showed a high proportion of both HIV and syphilis prevalence among individuals who conducted HIV and syphilis testing. This prevalence is higher than previously reported in other studies in

China[13], South Africa[22], Vietnam[23]. Additionally, our results found that engaging in commercial sex and the lack of condom use in the last sexual act were common among those testers, which is similar to previous studies in China[13] and England[24]. This indicates that heterosexual STI clinic attendees bear a high burden of HIV and syphilis infection, warranting the necessity of improving PITC implementation among this population.

Our data indicated that, amongst individuals who refused to test, a majority reported having never been tested for HIV and syphilis in the past year. However, commercial sex in the past 6 months and low rates of condoms use is particularly common among the non-testers in this study. This finding is consistent with previous other studies[12, 25–27]. Therefore, there may be many HIV and syphilis infected patients who remained undetected and untreated among this population.

This study has several limitations. First, all the data were collected through self-report, which may be prone to information bias. Second, the participants were not randomly selected in this study. This may limit the external validity of our findings. Third, this study was cross-sectional, so relations should be interpreted as associations that might or might not be casual. Finally, this study could not account for many factors that likely influence the frequency of testing- policy environment, clinic factors, and local norms.

Conclusion

In conclusion, provider-initiated HIV and syphilis testing is an effective strategy to reach high-risk individuals of contracting HIV and syphilis. However, this service is not well promoted among STD clinic attendees in China. Future studies on exploring innovative methods to improve the knowledge and awareness of HIV and syphilis infection among STI clinic attendees are warranted.

Abbreviations

PITC
Provider-initiated HIV and syphilis testing and counseling
HIV
Human Immunodeficiency virus
STD
Sexually transmitted disease
ELISA
Enzyme-linked Immunoassay
RPR
Rapid Plasma Regain
TPPA
Treponema Pallidum Particle Agglutination
USD

US dollars
aOR
Adjusted Odds Ratio

Declarations

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Authors' contributions

PZ and CW participated in all stages and wrote the manuscript, SH helped collect the data; HC helped reviewed the English language. WT, HZ and BY helped design the study and reviewed the manuscript.

Ethics approval and consent to participate

Ethical approval was obtained from institution review committees at the Dermatology Hospital of Southern Medical University（GDDHLS-20150309）. All participants agreed to informed consent.

Consent for publication

Not Applicable.

Competing interests

The authors declare that they have no conflict of interest.

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Tables

Table 1 Demographic characteristics, behaviors, HIV and Syphilis testing among STI clinic attendees, 2016 (*N*=1943)

Tables2 The reasons for not conducting HIV and syphilis testing

Reasons	HIV testing (*n*=766, %)	Syphilis testing (*n*=500, %)
High cost for test	8(1.0)	6(1.2)
Worried about confidentiality	47(6.1)	41(8.2)
Not necessary for test	548(71.5)	338(67.6)
Worried about discrimination	11(1.4)	2(0.4)
Ever receiving a test	112(14.6)	86(17.2)
Worried about positive results	15(2.0)	14(2.8)
Others	25(3.3)	13(2.6)

Table 3 Factors associated with HIV and syphilis testing among heterosexual STI clinic attendees in Guangdong, 2016 (*n*=1943)

Variables	HIV testing *n* (%)		Syphilis testing *n* (%)		Total
	Yes(*n*=1177)	No(*n*=766)	Yes(*n*=1443)	No(*n*=500)	
Age (Years)					
< 25	247(21.0)	164(21.4)	288(20)	123(24.6)	411(21.2)
25-35	456(38.7)	324(42.3)	550(38.1)	230(46)	780(40.1)
35 to 45	280(23.8)	179(23.4)	363(25.2)	96(19.2)	459(23.6)
45 above	194(16.5)	99(12.9)	242(16.8)	51(10.2)	293(15.1)
Gender					
Male	652(55.4)	331(43.2)	748(51.8)	235(47)	983(50.6)
Female	525(44.6)	435(56.8)	695(48.2)	265(53)	960(49.4)
Marital Status					
Unmarried	218(18.5)	145(18.9)	267(18.5)	96(19.2)	363(18.7)
Married	945(80.3)	601(78.5)	1155(80.0)	391(78.2)	1546(79.6)
Others	14(1.2)	20(2.6)	21(1.5)	13(2.6)	34(1.7)
Education					
Illiteracy	66(5.6)	29(3.8)	81(5.6)	14(2.8)	95(4.9)
Primary school	268(22.8)	196(25.6)	375(26.0)	89(17.8)	464(23.9)
Middle school	481(40.9)	299(39.0)	591(41.0)	189(37.8)	780(40.1)
Senior high school and above	362(30.8)	242(31.6)	396(27.4)	208(41.6)	604(31.1)
Annual income (USD)					
≤$1500	46(3.9)	29(3.8)	60(4.2)	15(3.0)	75(3.9)
$1501-$5000	345(29.3)	248(32.4)	473(32.8)	120(24.0)	593(30.5)
$5001-$9000	493(41.9)	281(36.7)	583(40.4)	191(38.2)	774(39.8)
≥$9001	293(24.9)	208(27.2)	327(22.7)	174(34.8)	501(25.8)
Ever infected with STD					
Yes	179(15.2)	134(17.5)	260(18)	53(10.6)	313(16.1)
No	998(84.8)	632(82.5)	1183(82)	447(89.4)	1630(83.9)
Condom use in the last sexual act					
Yes	527(44.8)	158(20.6)	559(38.7)	126(25.2)	685(35.3)
No	650(55.2)	608(79.4)	884(61.3)	374(74.8)	1258(64.7)
Frequency of condom use in the last 6 months					
None	152(12.9)	98(12.8)	185(12.8)	65(13.0)	250(12.9)
Sometimes	779(66.2)	585(76.4)	994(68.9)	370(74.0)	1364(70.2)
Always	246(20.9)	83(10.8)	264(18.3)	65(13.0)	329(16.9)
Ever had paid sex in the last 6 months					
Yes	209(17.8)	41(5.4)	212(14.7)	38(7.6)	250(12.9)
No	968(82.2)	725(94.6)	1231(85.3)	462(92.4)	1693(87.1)
Condom use in the last paid sexual act					
Yes	102(61.1)	22(26.5)	106(48.6)	18(56.2)	124(49.6)
No	65(38.9)	61(73.5)	112(51.4)	14(43.8)	126(50.4)
Education on HIV and STDs related knowledge in the last 12 months					
Yes	442(37.6)	183(23.9)	534(37)	91(18.2)	625(32.2)
No	735(62.4)	583(76.1)	909(63)	409(81.8)	1318(67.8)
Ever had HIV testing in the last 12 months					
Yes	52(4.4)	15(2.0)	60(4.2)	7(1.4)	67(3.5)
No	1125(95.6)	751(98.0)	1383(95.8)	493(98.6)	1876(96.5)
Ever had syphilis testing in the last 12 months					
Yes	76(6.5)	69(9.0)	120(8.3)	25(5.0)	145(7.5)
No	1101(93.5)	697(91.0)	1323(91.7)	475(95.0)	1798(92.5)
HIV infection					
Positive	26(2.2)	-	-	-	26(2.2)
Negative	1151(97.8)	-	-	-	1151(97.8)
Syphilis infection					
Positive	-	-	310(21.5)	-	310(21.5)

Negative	-	-	1133(78.5)	-	1133(78.5)

Variables	HIV testing [a]		Syphilis testing [a]	
	Crude model	Adjusted model	Crude model	Adjusted model
	OR (95% CI)	*OR* (95% CI)	*OR* (95% CI)	*OR* (95% CI)
Ever infected with STD				
Yes	1.17(0.92~1.49)	1.19(0.93~1.53)	1.88(1.37~2.56) *	1.78(1.29~2.44) *
No	Ref.	Ref.	Ref.	Ref.
Condom use in the last sexual encounter				
Yes	3.06(2.48~3.77) *	3.25(2.61~4.05) *	3.06(2.48~3.77) *	2.23(1.76~2.84) *
No	Ref.	Ref.	Ref.	Ref.
Frequency of condom use during the last 6 months				
Always	1.93(1.35~2.75) *	1.98(1.36~2.89) *	1.41(0.95~2.10)	2.01(1.32~3.05) *
Sometimes	0.87(0.66~1.14)	0.84(0.63~1.12)	0.93(0.69~1.27)	1.04(0.75~1.44)
None	Ref.	Ref.	Ref.	Ref.
Ever had paid sex during the last 6 months				
Yes	3.80(2.70,5.36) *	3.19(2.24~4.56) *	2.08(1.46~2.97) *	1.84(1.27~2.67) *
No	Ref.	Ref.	Ref.	Ref.
Condom use during the last paid sexual act				
Yes	4.15(2.49~6.89) *	3.27(1.81~5.92) *	0.78(0.42~1.46)	1.21(0.58~2.52)
No	Ref.	Ref.	Ref.	Ref.
HIV and STDs related knowledge during the last 12 months				
Yes	1.85(1.51~2.26) *	1.94(1.58~2.40) *	2.53(1.97~3.24) *	2.91(2.25~3.77) *
No	Ref.	Ref.	Ref.	Ref.
Ever had HIV testing in the last 12 months				
Yes	2.32(1.30~4.15) *	2.11(1.20~3.69) *	3.06(1.39~6.74) *	1.74(1.27~2.38) *
No	Ref.	Ref.	Ref.	Ref.
Ever had syphilis testing in the last 12 months				
Yes	0.70(0.50~0.98) *	0.75(0.53~1.06)	1.73(1.11~2.69) *	1.87(1.19~2.94) *
No	Ref.	Ref.	Ref.	Ref.

Note: [a] Adjusted model was adjusted for age (continuous), gender, ethnic, education, marital status and monthly income. *$P<0.05$.

Table4 Factors associated with HIV and syphilis infection among heterosexual STI clinic attendees in Guangdong, 2016

Variables	HIV infection [a] (n=1177)		Syphilis infection [a] (n=1443)	
	Crude model OR (95% CI)	Adjusted model OR (95% CI)	Crude model OR (95% CI)	Adjusted model OR (95% CI)
Ever infected with STD				
Yes	2.04(0.84~4.92)	1.74(0.66~4.61)	5.36(4.02~7.13) *	5.31(3.93~7.18) *
No	Ref.	Ref.	Ref.	Ref.
Condom use in the last sexual encounter				
No	1.63(0.65~4.06)	1.28(0.47~3.51)	2.30(1.73~3.07) *	1.75(1.29~2.39) *
Yes	Ref.	Ref.	Ref.	Ref.
Frequency of condom use during the last 6 months				
None	1.64(0.33~8.22)	1.41(0.25~8.09)	2.21(1.37~3.58) *	1.23(0.74~2.07)
Sometimes	1.59(0.46~5.43)	1.22(0.33~4.61)	1.80(1.23~2.62) *	1.18(0.78~1.77)
Always	Ref.	Ref.	Ref.	Ref.
Ever had paid sex during the last 6 months				
Yes	3.47(1.57~7.67) *	2.00(1.24~3.12) *	0.99(0.70~1.41)	1.12(0.76~1.64)
No	Ref.	Ref.	Ref.	Ref.
Condom use in the last paid sexual act				
No	2.26(0.60~8.59)	1.45(0.31~6.71)	3.26(1.72~6.17) *	2.69(1.26~5.76) *
Yes	Ref.	Ref.	Ref.	Ref.
HIV and STDs related knowledge during the last 12 months				
Yes	0.90(0.40~2.04)	1.04(0.43~2.53)	0.77(0.59~1.01)	0.98(0.74~1.30)
No	Ref.	Ref.	Ref.	Ref.

Note: [a] Adjusted model was adjusted for age (continuous), gender, ethnic, education, marital status and monthly income. *P<0.05