

Original Article

The prevalence of sexually transmitted infections in successfully referred regular heterosexual sexual partners of clients diagnosed with uncomplicated gonococcal genital infection

無併發症淋球菌生殖器感染病人成功轉介的異性經常性性伴侶性病（性傳感染）患病率

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Background: Partner notification is important in sexually transmitted infection (STI) management. The aims of the study are to document the prevalence of STI in regular heterosexual partners of gonorrhoea clients and to analyse factors associated with the presence of gonococcal infection in partners. *Methodology:* This was a pilot study based on a retrospective chart review on newly diagnosed gonorrhoea clients and their regular heterosexual partners, who were successfully referred to the same Social Hygiene Clinic between 1st October 2004 and 30th April 2005. *Results:* A total of 99 pairs of gonorrhoea case and partners were identified. Thirty partners (30.3%) had no STI on screening. The other 69 partners (69.7%) had STIs and among them, gonorrhoea was present alone in 28 partners (40.6%), gonorrhoea was present together with other STIs in 19 partners (27.5%) and STIs other than gonorrhoea was present in 22 partners (31.9%). Thus by epidemiological treatment of all 99 regular partners, early treatment of gonorrhoea could be given in 47 partners (47.5%). Multivariate analysis failed to detect any factors associated with gonococcal infection in partners. *Conclusion:* Gonorrhoea and other STIs were frequently present in regular heterosexual partners of gonococcal clients and thus partner notification should be carried out.

背景：通知伴侶對處理性病(性傳感染)很重要。本研究的目的是要確定淋病患者的異性經常性性伴侶中的性病(性傳感染)患病率與及分析這些伴侶中淋病感染的有關因素。**方法：**此前期研究建基於回顧性檢查 2004 年 10 月 1 日至 2005 年 4 月 30 日期間於同一社會衛生科診所的淋病新症病人及其異性經常性伴侶的病歷。**結果：**合共發現 99 對淋病患者及其伴侶。30 名(30.3%)性伴侶經初步檢查無性傳感染。69 名(69.7%)性伴侶患有性病(性傳感染)，其中有 28 名(40.6%)祇患淋病，另有

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19名(27.5%)兼患淋病和其他性病(性傳染), 22名(31.9%)祇患其他性病(性傳染)。可見對99名異性經常性伴侶進行流行病治療則能對47名(47.5%)性伴侶給予早期的淋病治療。多元分析未發現影響性伴侶患淋病的因素。**結論:**淋病患者的異性經常性伴侶常患有淋病及其他性病(性傳染), 故通知伴侶應該進行。

Keywords: Gonorrhoea, partners

關鍵詞: 淋病, 性伴侶

Introduction

Gonorrhoea (GC) is a common sexually transmitted infection (STI) in Hong Kong. It ranked as the third commonest STI reported in Social Hygiene Service in the year 2004.¹ GC is a bacterial STI readily cured by antibiotics but female clients can be asymptomatic and untreated infection can lead to pelvic inflammatory disease, ectopic pregnancy and infertility. Partner notification by the index cases (patient referral) and epidemiological treatment (i.e. treatment of attended partners based on their contact history with index clients irrespective of the initial screening results) are being carried out in the Social Hygiene Service. According to statistics of the Social Hygiene Service in 2004, for those clients who received partner referral from our health nurses, the rate of successful partner notification (for all STI as a whole) was 58.3% and 51.3% for male and female index clients respectively. The aims of epidemiological treatment are to ensure timely treatment of infected sex partners, to reduce potential sequel of untreated disease and to prevent reinfection of the index cases. Moreover, it provides an opportunity for partner counselling, health education and screening of other STIs. The potential effectiveness of such an approach depends on willingness of index client to refer their partners, partners' compliance in seeking care after notification, whether the STI can be eradicated by drug therapy, drug compliance of partners and the prevalence of gonorrhoea and other STIs in partners. The aims of the present study are: 1) to document the prevalence of STI in regular heterosexual partners of GC clients in

Social Hygiene Service and 2) to analyse factors associated with the presence of GC in partners.

Methodology

Inclusion criteria

This a retrospective study carried out in Social Hygiene Clinics. They were the only public specialty clinics dealing with clients with various STIs and provided free of charge service to Hong Kong citizens. All newly diagnosed GC cases from 1st October 2004 to 30th April 2005 were identified. Cases were included if they had a heterosexual orientation, were willing to refer regular partners and their partners attended the same Social Hygiene Clinic as the index cases. Repeat GC infections were counted as further cases if sexual history suggested reinfections rather than treatment failure.

Clinical management and partner notification

After obtaining consent, history taking, physical examination and urethral smear examination were carried out for all patients (index cases or partners). For female patients, additional swabs were taken from vagina and endocervix. Appropriate smears were examined under microscopy by Gram stain and saline wet-mount and they were also sent for culture. Chlamydia trachomatis (CT) PCR was not universally performed; it was carried out in all new clinic attendees but only in some old attendees subjected to the decision of the attending physicians. Serology tests for syphilis and HIV were also performed. All GC cases received appropriate

treatment for their STI(s) in our clinic and test of cure for GC was carried out one week later. They were interviewed by health nurses who explained to the cases the nature of STI (including its mode of transmission and prevention) as well as the importance of referral of contacts. In our clinics, partner notification was performed by patient referral, i.e. index cases notified their partners themselves with the use of a contact slip. Diagnostic coding, instead of the disease name, was written on the contact slip to ensure confidentiality. History taking, physical examination and appropriate investigations were carried out for referred partners. Epidemiological treatment for GC was given to all attended partners irrespective of their initial microscopy results. Our health nurses also kept record on partners successfully referred to our clinics.

Data collection

All newly diagnosed GC cases, with their sexual partners seen in the same clinic within the study period, were recruited. Data on gender, STI(s) diagnosed in the same visit, treatment received, days lapsed for partner referral, timing of and condom use during last sexual contact with regular partners were collected by review of clinical records.

Diagnosis of sexually transmitted infections

GC was present if either microscopy was positive for intracellular gram-negative diplococci or culture was positive for *Neisseria gonorrhoeae*. CT was detected by means of Amplicor test, a FDA approved test based on polymerase chain reaction. Non-gonococcal urethritis (NGU) and non-specific genital tract infection (NSGI) were diagnosed if microscopy examination revealed 5 or more and 30 or more polymorphonuclear cells per high power field from anterior urethra of male and endocervix of female respectively. Saline wet-mount of high vaginal smear was used to identify *Trichomonas vaginalis* (TV).

Statistical analysis

All calculations were performed by SPSS 10.0.

Variables potentially associated with GC presence in partners were assessed by chi-square test in univariate analysis. These included gender of index cases, presence of mixed STIs in index cases, days lapsed for partner referral, timing of and condom use in last sexual intercourse with regular partners. Odds ratios with 95% confidence intervals were calculated for both univariate and multivariate analyses. Multivariate analysis by logistic regression was used to analyse predictors for GC presence in partners, with entry into model when $p < 0.2$ in the initial univariate analysis.

Results

Spectrum of sexually transmitted infections in index cases

A total of 99 pairs of GC cases and regular partners were identified. The sex ratio of index cases (F:M) was 1:1.36 (47 female, 57 male). All of them were HIV-antibody negative. All index cases had GC by definition and additional STIs were present in 20 cases (20.2%). No cases had more than two STIs. The spectrum of STIs in index cases was listed in Table 1. The commonest concurrent STI was CT (14.1%).

Spectrum of sexually transmitted infections in regular partners

Regular partners were seen in a median of three days after index cases were diagnosed to have GC. While 30 partners (30.3%) had no STI on screening, the other 69 partners (69.7%) had STIs (Figure 1). Among the 69 partners infected with STIs, GC was present alone in 28 partners (40.6%), GC was present together with other STIs in 19 partners (27.5%) and STIs other than GC was present in 22 partners (31.9%). Thus by epidemiological treatment of all 99 regular partners, early treatment of GC could be given in 47 partners (47.5%) (Table 1). By encouraging partner to attend clinic for examination, diagnosis of STIs other than GC could also be achieved in 41 partners (41.4%). The most common concurrent STI in GC positive partners was CT,

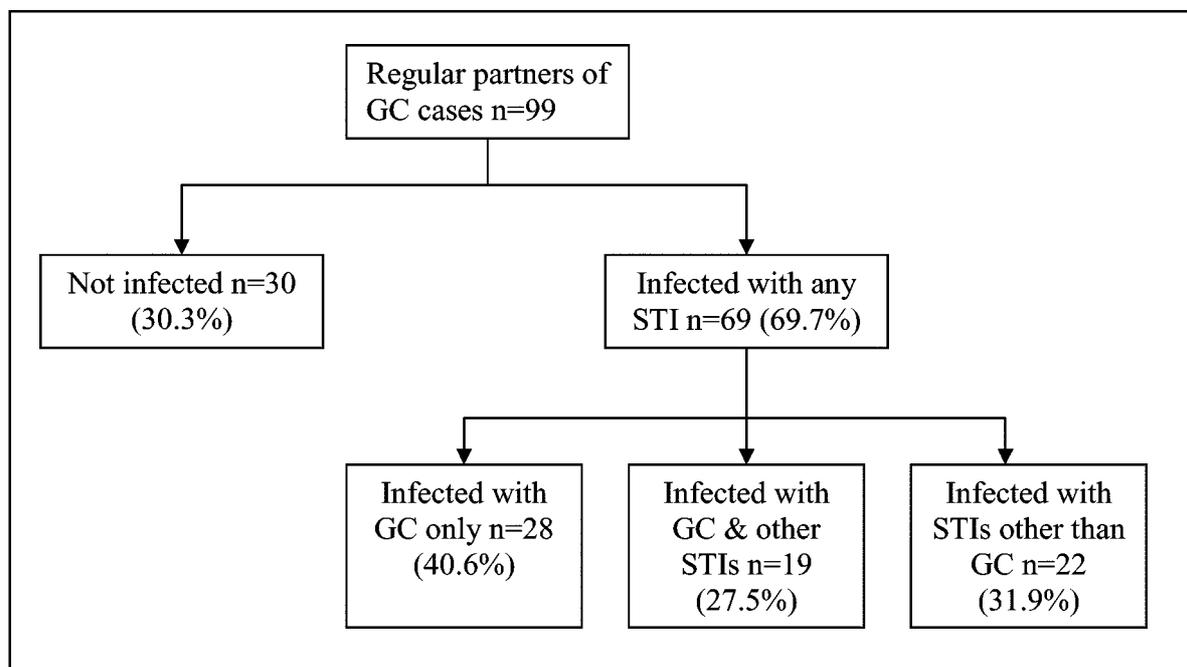


Figure 1. Sexually transmitted infections in regular partners of GC cases.

Table 1. Spectrum of sexually transmitted infections present in index GC cases and their regular partners

Types of sexually transmitted infections	Index (n=99)	Regular partners (n=99)
	No. (%)#	No. (%)#
No STI	0 (0.0)	30 (30.3)
GC	99 (100.0)	47 (47.5)
CT	14 (14.1)	25 (25.3)
TV	1 (1.0)	2 (2.0)
NGU/NSGI	2 (2.0)	13 (13.1)
Other STIs	3 (3.0)	4 (4.0)

Abbreviations: GC: Gonorrhoea; CT: Chlamydia trachomatis; TV: Trichomonas vaginalis, NGU: non-gonococcal urethritis; NSGI: non-specific genital tract infection; STI: sexually transmitted infection

The sum is greater than 100% as multiple infections can be present in the same patient

followed by NGU/NSGI and TV (Table 2). All partners received epidemiological treatment for GC and additional treatment was also given if other STIs were diagnosed.

Condom use and median time in last sexual contact

Condom use was infrequent and only 11 pairs (11.1%) reported the use of condom during their last sexual intercourse with regular partners. The median time of last sexual contact with sexual

partners in the condom use and without condom group was 5 days and 14 days respectively.

Factors associated with the presence of GC in regular partners

Table 3 showed the association between the presence of GC in regular partners and various variables. In univariate analysis, although it seemed that no condom use during the last sexual intercourse with regular partners ($p=0.167$), last sexual contact with index cases ≤ 14 days

Table 2. Spectrum of sexually transmitted infections in GC positive partners

Types of sexually transmitted infections in addition to GC	GC positive partners (n=47)	Percentage#
Nil	28	59.6
CT	15	31.9
TV	2	4.3
NGU/NSGI	4	8.5
Other STIs	0	0.0

Abbreviations: GC: Gonorrhoea; CT: Chlamydia trachomatis; TV: Trichomonas vaginalis, NGU: non-gonococcal urethritis; NSGI: non-specific genital tract infection; STI: sexually transmitted infection

The sum is greater than 100% as multiple infections can be present in the same patient

Table 3. Univariate and multivariate analyses of factors predicting presence of GC in partners

Variables	GC absent in partners No. (%)	GC present in partners No. (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Gender of index cases				
Female	23 (44.2)	19 (40.4)	0.86 (0.39-1.9)	-
Male	29 (55.8)	28 (59.6)	1.0	
STI diagnosed in index cases				
GC only	39 (75.0)	41 (87.2)	2.28 (0.79-6.59)	2.37 (0.78-7.17)
GC + other STIs	13 (25.0)	6 (12.8)	1.0	1.0
Time interval for partner referral				
≤14 days	43 (82.7)	45 (95.7)	4.71 (0.96-23.05)	4.07 (0.80-20.82)
>14 days	9 (17.3)	2 (4.3)	1.0	1.0
Condom use in last sexual contact with partner				
No	44 (84.6)	44 (93.6)	2.67 (0.67-10.70)	3.90 (0.91-16.66)
Yes	8 (15.4)	3 (6.4)	1.0	1.0
Last sexual contact with index case				
≤14 days	33 (63.5)	36 (76.6)	1.88 (0.78-4.54)	1.98 (0.77-5.10)
>14 days	19 (36.5)	11 (23.4)	1.0	1.0

($p=0.158$) and time interval for partner referral ≤ 14 days ($p=0.056$) were associated with a higher GC detection rate in partners, they did not reach statistical significance. Multivariate analysis also failed to detect any significant variables associated with GC detection in partners.

Discussion

Partner notification is a core component of STI management. Three approaches for partner

notification have been used: provider referral, patient referral and contract referral.² Ideally, all sexual partners of index cases should be notified, evaluated and treated accordingly. But in practice, many index cases do not notify their partners and partners may not attend even after notification. Alternatively, patient-delivered partner therapy (PDPT) has been advocated. It is the practice of providing disease-specific antimicrobial agents to clients for delivery to their sex partners, in addition to recommending referral for evaluation.³ Two randomised controlled trials compared strategies

that included PDPT with those primarily involved partner referral. The first found a non-significant reduction in persistent or recurrent Chlamydia infection in women.⁴ The second found significant fewer persistent or recurrent chlamydial or gonococcal infections among men and women whose partners had received expedited therapy, including PDPT, compared with those whose partners had only received a referral.⁵ The potential effectiveness of PDPT and epidemiological treatment of partners (regardless of their culture result) depends, in part, on the prevalence of concordant STIs present in the partners. In the present study, GC is present in 47.5% of regular partners of GC clients, which concurs with data from the literature (33% to 47%).^{3,6,7} Initial assessment of GC partners by microscopic examination for intracellular gram negative diplococci is not without limitation, especially of its well known lower detection rate in women (sensitivity of 50-70%).⁸ Thus, in the absence of reliable point-of-care testing for GC, epidemiological treatment may be beneficial in the subgroup of partners who may not return for follow up for their culture results.

Risk factors of GC infection, according to studies in Western countries, include African Americans, low socioeconomic status, early onset of sexual intercourse, unmarried, past history of GC infection, illicit drug use and prostitution.⁸ In the present pilot study, instead of these risk factors, we have collected data describing some of the characteristics of the sexual relationship between clients and their regular partners and the time for referral. In an attempt to find out which subgroup of partners may be mostly benefited from epidemiological treatment, both univariate and multivariate analyses failed to detect any variables significantly associated with detection of GC in partners. Moreover, for those who were infected with any STIs, 59.4% had STIs other than GC, the most common ones were CT and NGU/NSGI. Thus, we believe that partner notification is better strategy in our clients than PDPT as it allows

detection and treatment of other STIs and provides an opportunity for health education of safer sex behaviour. However, we acknowledge that the current study has limited power in detecting significant factors for GC detection in partners because of its small size.

While partner notification and epidemiological treatment have the theoretical advantages of screening of other STIs in partners, health education on safe sex behaviour, treating asymptomatic partners and prevent disease sequel, it also have disadvantages in terms of drug-related complications, unnecessary treatment of uninfected partners and risk of fostering antibiotic resistance. Despite the central position of contact tracing or partner notification in STIs management, its impact on index patient reinfection rate, changes in behaviour of index cases and their partners, incidence of STIs, and cost-effectiveness has not been firmly established.^{2,6,7} This is, in part, due to few proper randomised controlled trials and variability of study designed (e.g. referral method and the differences in disease assessed) that made comparison of trials difficult.²

The present study has its own limitations. Firstly, to facilitate data collection, only regular partners seen within the same clinic were included. Although there was no concrete data on those whose regular partners were seen in different Social Hygiene Clinics, we did not think that they would be different from those recruited in the present study. Secondly, the present study is only a pilot one and further trials with a larger sample size and more demographic data are necessary to verify any other significant factor(s) associated with GC detection in regular partners. Thirdly, the study did not include any data on regular partners that were not managed in Social Hygiene Clinics or were not treated at all by any physicians even though index cases had been informed of the risk of reinfection. The inclusion of such data, although not possible at present, would give a clearer

picture on the STI prevalence in regular partners. Moreover, the data should not be extrapolated to casual sex partners of GC clients or GC clients and partners detected in other clinic settings (e.g. general outpatient clinics), whose STI risk profile might be different from the subjects recruited in the present study.

In conclusion, regular partners of GC clients should be assessed as they commonly have GC or other STIs. Partner notification should be used, if possible, as it allows detection and treatment of other STIs and provides an opportunity for health education of safe sex behaviour. Although for the population as a whole, the cost-effectiveness of partner notification and epidemiological treatment awaits to be determined, from the perspective of individual clients, they eliminate a potential source of reinfection, allow early treatment of asymptomatic infected partners and prevent disease sequel. Thus they should be carried out in managing clients with GC.

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References

1. Centre for Health Protection, Department of Health. Hong Kong STD/AIDS Update Quarter 4, 2004 Vol. 10, No.4:174-5.
2. Mathews C, Coetzee N, Zwarenstein M, Lombard C, Guttmacher S, Oxman A, et al. A systematic review of strategies for partner notification for sexually transmitted diseases, including HIV/AIDS. *Int J STD AIDS* 2002;13:285-300.
3. Stekler J, Bachmann L, Brotman RM, Erbedding EJ, Lloyd LV, Rietmeijer CA, et al. Concurrent sexually transmitted infections (STIs) in sex partners of patients with selected STIs: implications for patient-delivered partner therapy. *Clin Infect Dis* 2005;40:787-93.
4. Schillinger JA, Kissinger P, Calvet H, Whittington WL, Ransom RL, Sternberg MR, et al. Patient-delivered partner treatment with azithromycin to prevent repeated Chlamydia trachomatis infection among women: a randomized, controlled trial. *Sex Transm Dis* 2003;30:49-56.
5. Golden MR, Whittington WL, Handsfield HH, Hughes JP, Stamm WE, Hogben M, et al. Effect of expedited treatment of sex partners on recurrent or persistent gonorrhea or chlamydial infection. *N Engl J Med* 2005;352:676-85.
6. Rothenburg RB and Potterat JJ. Partner notification for sexually transmitted diseases and HIV infection. In: Holmes KK, Sparling PF, Mardh P, et al editors. *Sexually transmitted diseases*. 3rd Edition. New York: McGraw-Hill, 1999:745-52.
7. Khan A, Fortenberry JD, Juliar BE, Tu W, Orr DP, Batteiger BE. The prevalence of chlamydia, gonorrhea, and trichomonas in sexual partnerships: implications for partner notification and treatment. *Sex Transm Dis* 2005;32:260-4.
8. Hook EW III, Handsfield HH. Gonococcal infections in the adults. In: Holmes KK, Sparling PF, Mardh P, et al editors. *Sexually transmitted diseases*. 3rd Edition. New York: McGraw-Hill, 1999:951-66.