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High rate of partner treatment among *Chlamydia trachomatis* infected pregnant women in Lima, Peru

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Abstract

This was a substudy of sixty *Chlamydia trachomatis* infected women from a larger study of pregnant women in Lima, Peru. Participants were encouraged to bring their partners in for concurrent patient-partner treatment (CPPT). The alternative partner treatment was expedited partner therapy (EPT). Partner treatment uptake was 91.7%. Twenty one partners (38.2%) received treatment through CPPT, and 34 (61.8%) through EPT. Living with the partner was significantly associated with having the partner treated ($p=0.0028$).

Keywords

Chlamydia trachomatis; concurrent patient-partner treatment; expedited partner therapy

Chlamydia trachomatis infection during pregnancy has been linked to numerous adverse outcomes. A study in the Netherlands found a strong association between chlamydial infection and preterm delivery before 32 and 35 weeks gestation¹, while another study in New South Wales demonstrated a 40% increase in the odds of stillbirth associated with a prior chlamydia notification². Moreover, infants exposed to the bacteria can develop conjunctivitis, pneumonia as well as asymptomatic rectal and vagina infections³. Because of the compelling evidence for adverse outcomes in pregnancy, CDC has recommended routine screening for *Chlamydia trachomatis* during the first prenatal visit⁴. However, screening and prompt treatment alone might not suffice to guarantee a negative test of cure and prevent repeated infection. Acquisition of new partners and failure to treat all partners have been identified as risk factors for reinfection⁵. Concurrent patient-partner treatment is a method in

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which patients are instructed to bring their own partners when they return for treatment⁶. Expedited partner therapy, on the other hand, is the clinical practice of treating the sex partners of patients, in whom sexually transmitted infections are diagnosed, by providing prescriptions or medications to the patient to take to the partner without the health care provider first examining the partner⁷.

In Peru, a national population-based survey in 2002 found a prevalence rate of chlamydial infection of 6.5% in women aged 18 to 29 years old⁸. Several studies in Peru also showed a significant role of partners in determining the risk of HIV and other STIs among pregnant women^{9,10}. CPPT and EPT are not offered as a standard of care in Peru and physicians only focus on the syndromic management of sexually transmitted diseases¹¹.

As part of a larger study to determine the acceptability and feasibility of *Chlamydia trachomatis* screening among pregnant women in Lima, Peru, we found a prevalence of *Chlamydia trachomatis* of 10%¹². The primary objectives of the substudy were to report partner treatment uptake and to examine the associations between partner treatment uptake and whether the women were living with their partners.

Study design and methods were reported previously in the larger study¹³. All sixty *Chlamydia trachomatis* infected pregnant women were asked to return to the hospital for treatment and counselling. They were encouraged to bring their partners when they came back for counseling and concurrent patient-partner treatment. Following CDC 2010 guidelines, we instructed participants to bring the partner(s) who had sexual contact with them during the 60 days preceding diagnosis, or the most recent partner if the time of last sexual contact was more than 60 days⁴. For those who brought their partners in, the couple attended counseling together and then both received directly observed treatment with 1g of oral azithromycin (CPPT). Women whose partners did not come received the same directly observed treatment at the hospital and brought home 1g azithromycin as well as instructions to deliver to the partners themselves (EPT). We also asked participants to come back to the hospital for a test of cure in 3 weeks. Those whose test of cure came back positive were retreated.

Specimens were tested for *Chlamydia trachomatis* using the Aptima Combo2 system (Hologic, San Diego, California, USA) at the Laboratory of Sexual Health of Cayetano Heredia University in Lima, Peru. HIV and syphilis status of the participants were collected from hospital's medical chart. Data analysis was conducted using SAS 9.3 (SAS Institute, Inc., Cary, NC). Demographics, relationship status, risk behaviors, genital/vaginal symptoms (discharge, wound, ulcer or genital wart) of *Chlamydia trachomatis* infected pregnant women and their partners, pregnant women's test of cure results as well as partner treatment uptake were analyzed by descriptive statistics. The partner was considered treated with CPPT if he came for treatment with the pregnant woman and was considered treated with EPT if the woman chose to bring home the medication. We then evaluated the associations between living with the partner and partner treatment. Exact p-value was reported, using Fisher's exact test.

The age of infected women ranged from 16 to 42 years old (median age was 23). The majority of those women was less than 25 years of age (60%), among which 38.8% was 19 years old or younger (table 1). Fifty-nine (98.3%) out of 60 infected women came back for treatment. Only one woman said she had got tested elsewhere and did not think she had been infected. Among those who received treatment, 52 (88.1%) returned for a test of cure.

Of 60 partners identified, 40 (66.7%) were cohabiting with the patients. Seven (11.7%) were husbands and 33 (55.0%) were live-in partners of the participants. All of the partners were the fathers of the babies the women were going to have. Fifty five partners (91.7%) received treatment, either by direct observation or report of infected index case. Among those partners, 21 (38.2%) came to the hospital with the women to get concurrent patient-partner therapy, and 34 (61.8%) did not come and got treatment through expedited partner therapy. One of the five women whose partners didn't get any treatment did not come to be treated for herself. For the remaining four, the women were not able to, or did not want to contact their partners. Compared to women who did not live with their partners, women who lived with the partners were significantly more likely to get the partners treated (100% vs 75%, $p=0.0028$) (table 3).

Of 59 treated women, 52 (88.1%) came back for a test of cure. The median time between date of treatment and date of return visit for a test of cure was 22 days (Interquartile range: 21-27 days). Six (11.5%) of those who came back tested positive and after the second treatment, subsequent tests of cure among these women were negative. The proportions of women tested positive were 10.5%, 10.3% and 25.0% among CPPT, EPT and no treatment group, respectively (table 4).

In our substudy of *Chlamydia trachomatis* infected pregnant women in Peru, we found a very high rate of partner treatment uptake, either by direct observation or by the number of index cases getting medications for the partners. EPT was the more preferable option. A study on partner services in California Family Planning Clinics found that only 34% of the partners of *Chlamydia trachomatis* infected women had been receiving treatment through either CPPT or EPT¹³. In another study by Mickiewicz et al, which examined the acceptance rate of EPT among *Chlamydia trachomatis* and *Neisseria gonorrhoeae* patients in an urban clinic in Denver, USA, the rates ranged from 20 to 48%, depending on the requirement of complete documentation of EPT in the clinic electronic medical record¹⁴. Several reasons might help to explain the discrepancy between other studies' results and ours. First, pregnant women might take partner notification and treatment more seriously, since not only them but also the babies will suffer from the sequelae of infection. Second, many of the infected women reported sexual symptoms and that might be a reason why they and their partners were motivated to seek treatment. Third, the sample size of this study was much smaller, and the study design did not take into account the barriers concerning EPT in a real-world clinical setting¹⁵. Finally each of the partners identified was the father of the baby, therefore he could be more involved in the woman's prenatal care and routine visits, and might be more likely to come for concurrent treatment with the woman. Despite all the reasons above, our results still showed a promising possibility that by offering infected pregnant women both CPPT and EPT, we will be able to treat many more partners, who otherwise would go untreated.

We found a positive association between living with the partner and getting the partner treated. Yu et al reported found that being in a steady relationship had increased the odds of the partner getting treated by seven fold¹³. Indeed, women who live with the partner or have a steady relationship are more concerned about their partner's sexual health and their own risks of being reinfected. Also, living at the same place makes it easier for the women to bring their partners to the clinic or take home the medications to deliver to them.

Our study was subject to several limitations. First, all of the information on partners was reported by the pregnant women and might suffer from misclassification or recall biases. Our study suffered from the small sample size, with only 60 patients. Furthermore, participants were recruited from two of the largest hospitals in the country, and they might not be representative of *Chlamydia trachomatis* infected pregnant women from other maternal health clinics.

Despite the limitations, our findings still showed offering EPT as an alternative to CPPT would maximize the proportion of partners receiving treatment. Concurrent patient-partner treatment can be incorporated in routine prenatal visits and if CPPT is not possible, the choice of bringing home one dose of medication is highly acceptable among infected pregnant women. In the US, it is recommended that medical providers offer EPT to heterosexual patients with chlamydia when the provider cannot ensure that all of a patient's sex partners from the prior 60 days will be treated⁷. However, WHO currently has no guidelines on partner treatment of pregnant women¹⁶. Given the importance of treating partners of *Chlamydia trachomatis* infected pregnant women, we believe that these guidelines should be reviewed to include this essential part of STI management.

Further studies with larger sample sizes, in different maternal care facilities are necessary to examine the rate of partner treatment and its impact on the resolution of *Chlamydia trachomatis* infection among pregnant women.

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Short summary

A study of *Chlamydia trachomatis* infected pregnant women in Lima, Peru found high partner treatment uptake when participants were offered concurrent patient-partner treatment or expedited partner therapy.

Table 1

Characteristics of Chlamydia infected pregnant women in Lima, Peru (n=60)

Patient characteristics	N	% or Median (Range) *
Age	60	23 (16-42)
Age group (years)		
16-19	14	23.3
20-24	22	36.7
25 and older	24	40.0
Education		
Never studied	1	1.7
Primary	3	5.0
Secondary	37	61.7
University	16	26.7
Graduate education	3	5.0
Marital status		
Married	7	11.7
Not married	53	88.3
Gestational age in weeks		
First trimester (1-12)	11	18.3
Second trimester (13-27)	15	25.0
Third trimester (28 and over)	34	56.7
Parity		
First pregnancy	27	45.0
> Second pregnancy	33	55.0
Age of first sexual intercourse (years)	60	17 (13-27)
Number of sex partner(s) in the last 12 months		
1	58	96.7
2	2	3.3
New sex partner(s) in the last 12 months		
Yes	7	11.7
No	53	88.3
Having sexual intercourse in the last 3 months		
Yes	50	83.3
No	10	16.7
Consistent condom use in the last 3 months (among those who had sexual intercourse, n=50)		
Yes	2	4.0
No	48	96.0
Current STD symptoms [✓]		
Vaginal discharge	52	86.7
Wound or ulcer on genital area	2	3.3
Genital wart	3	5.0
None	8	13.3

Patient characteristics	N	% or Median (Range) *
Positive for syphilis (based on chart review)	0	0.0
Positive for HIV (based on chart review)	0	0.0
History of injection drug use	0	0.0
Returned for treatment	59	98.3
Returned for test of cure (among those treated, n=59)	52	88.1

* Percentages do not always sum up to 100% because of rounding

Y Could report more than one symptom

Table 2

Characteristics of the partner of last sexual intercourse of Chlamydia infected pregnant women in Lima, Peru (n=60)

Partner characteristics	N	%*
Relationship with patient		
Husband or live-in partner	40	66.7
Regular partner	19	31.7
Occasional partner	1	1.7
Father of the baby		
Yes	60	100.0
No	0	0.0
STD symptoms ^Y (based on patient's report)		
Penile discharge	1	1.7
Wound or ulcer on the genital area	1	1.7
Genital wart	2	3.3
None	56	93.3
History of Syphilis (based on patient's report) (n=59)		
Negative	38	64.4
Don't know	21	35.6
History of HIV (based on patient's report)		
Negative	47	78.3
Don't know	13	21.7
History of injection drug use (based on patient's report)		
Yes	1	1.7
No	51	85.0
Don't know	8	13.3

* Percentages do not always sum up to 100% because of rounding

^Y Could report more than one symptom

Table 3

Partner treatment, stratified by patient's living with partner status (n=60)

	Total	Living with partner	Not living with partner	
	N=60	N=40	N=20	
Partner treatment	N (%)	N (%)	N (%)	p *
CPPT or EPT	55 (91.7)	40 (100)	15 (75.0)	0.0028
No treatment	5 (8.3)	0 (0.0)	5 (25.0)	

* p-value is obtained using Fisher's exact test

Table 4

Association between partner treatment and a positive test of cure (n=52)

Partner treatment	Test of cure result (N=52)	
	Positive N (%)	Negative N (%)
Concurrent patient-partner treatment (CPPT)	2 (10.5)	17 (89.5)
Expedited partner therapy (EPT)	3 (10.3)	26 (89.7)
No treatment	1 (25.0)	3 (75.0)