

RISK FACTORS FOR *NEISSERIA GONORRHOEAE* IN A PROSPECTIVE COHORT OF KENYAN FEMALE SEX WORKERS

Harrison WG¹, Kinyari T², Meier A³, Brunham R⁴, Nguti R², Mugo NR⁵, Cohen CR⁶

¹University of California, Berkeley, USA; ²University of Nairobi, Kenya; ³University of Washington, Seattle, USA; ⁴University of British Columbia, Vancouver, Canada;

⁵Kenyatta National Hospital, Nairobi, Kenya; ⁶Department of Obstetrics, Gynecology and Reproductive Science, University of California, San Francisco, USA

Background

Neisseria gonorrhoeae infection (GC) has an annual global incidence of 62 million. Complications include pelvic inflammatory disease and increased susceptibility to and transmission of HIV. Coinfection with *Chlamydia trachomatis* (CT) has been associated with an even greater risk of said complications.

Cervicitis has a variety of etiologic agents and has been associated with prevalent GC. Diagnosis of cervicitis may indicate treatment of a potential GC infection.

Objectives

To determine whether STI and other factors are associated with GC infection in a high risk population.

To assess the temporality of infection with GC and *Chlamydia trachomatis* (CT) in a high risk population.

To assess the temporality of infection with GC and cervicitis in a high risk population.

Methods

A 299 member longitudinal cohort of Female Sex Workers (FSWs) was assembled in Nairobi, Kenya and followed a median of 14 months (IQR 6 – 24). Baseline characteristics were assessed at the initial visit.

Participants came back to the clinic every two months for follow up. Subjects underwent a clinical exam and gave a personal history since last visit.

Time of infection was estimated to be the midpoint between the last negative visit and first positive result. Cox Hazard Proportional Model was used to account for variables changing over time.

Results

Table 1. Baseline characteristics for 299 sex workers enrolled in a cohort in Nairobi, Kenya. Univariate/multivariate analyses of the relationship between GC incidence and characteristics.

	n = 299 (Baseline)	HR (95% CI)
Demographic		
Age, years (mean ± SD)	23.9 ± 3.1	0.55 (0.22, 1.3)
Years of prostitution (mean ± SD)	3.9 ± 3.1	0.96 (0.83, 1.1)
Number of clients per week (mean ± SD) [†]	11.7 ± 7.1	0.67 (0.31, 1.5)
Charge, Kenyan shillings (mean ± SD)	179 ± 147	0.83 (0.40, 1.7)
Age of menarche (mean ± SD)	14.6 ± 1.7	1.1 (0.53, 2.4)
Age of sexual debut (mean ± SD)	15.6 ± 1.9	2.7 (0.81, 8.9)
Never married	205 (69%)	0.85 (0.40, 1.8)
Frequent condom use (≥ 75%) [†]	123 (41%)	1.4 (0.59, 3.2)
Place of work: Bar vs. other	236 (79%)	0.45 (0.21, 0.97)
Douches	253 (85%)	5.2 (0.71, 38.6)
Douches with water and soap	188 (63%)	3.8 (1.33, 10.9)
Clinical		
Vaginal discharge in the past year	70 (23%)	0.30 (0.09, 0.98)
Cervicitis (clinical diagnosis) [†]	28 (9%)	3.1 (1.2, 8.4)
Laboratory		
HIV-1 seropositive [†]	87/288 (30%)	1.4 (0.64, 3.0)
<i>C. trachomatis</i> (PCR) [†]	24 (8%)	7.3 (3.0, 17.8)
<i>N. gonorrhoeae</i> (PCR)	18 (6%)	--
Bacterial vaginosis (Gram stain)	141/274 (51%)	1.9 (0.72, 5.0)
PID (clinical criteria)	55 (18%)	1.8 (0.88, 3.8)
Multivariate Predictor		HR (95% CI)
Cervicitis ^{†,‡}		3.1 (1.1, 8.6)
Incident CT ^{†,‡}		5.9 (2.2, 15.8)

[†] - values at each follow up

[‡] - adjusted for age, HIV serostatus, and significant univariate characteristics

Table 2. Time differential of GC and cervicitis in participants who were infected with GC and diagnosed with cervicitis during follow up.

	Frequency (n = 13)
Cervicitis ≥ 2 months prior GC	5 (38%)
Concurrent cervicitis and GC	5 (38%)
Cervicitis ≥ 2 months after GC	3 (24%)

Table 3. Time differential of GC and *C. trachomatis* (CT) infections in participants who were infected with GC and CT during follow up.

	Frequency (n = 9)
CT 2 months prior GC	1 (11%)
Concurrent infection	5 (56%)
CT 8 months after GC	1 (11%)
CT 12 months after GC	2 (22%)

Summary

In a cohort of 299 FSWs in Nairobi, Kenya, cervicitis and incident CT infection were associated with incident GC infection when adjusted for age, HIV serostatus, and significant factors in univariate analysis. HIV serostatus and condom use were not associated with an altered risk of GC.

Diagnosis of cervicitis showed a significant proportion (38%), but not a majority, of concurrency with incident GC infection.

The majority of participants infected with GC and CT over the course of the study were concurrently infected.

Discussion

Although cervicitis was associated with incident GC infection independent of incident CT, the lack of concurrency with GC suggests that syndromic management, i.e. treating a potential GC infection, may be ineffective in a high risk population.

The temporality of infection with GC and CT may indicate that one is altering the host's susceptibility to the other. There is evidence that GC downregulates the immune response, thereby enabling CT to establish itself more readily in the host.

Contact information:

William Harrison
University of California – Berkeley
School of Public Health
Berkeley, CA 94720
Telephone: 1 (703) 477 5248
Email: wharrison@berkeley.edu
wharrison@psq.ucsf.edu

Figure 1. Cumulative incidence of GC over follow up.

