Tubal Factor Infertility (TFI) Epidemiology in Infertility Clinic Patients

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Background

- Sexually transmitted infections, including chlamydia (CT) and gonorrhea (GC), are important risk factors for tubal factor infertility (TFI).
- Decreasing the incidence of CT-associated infertility (IF) is a primary goal of CT prevention efforts.
- The burden and epidemiology of TFI are not well described.
- Specific assessment for and diagnosis of TFI is generally made in an IF clinic setting.

Objective

- To describe the burden and epidemiology of TFI in IF clinic patients

Methods

- Study sites included a private IF practice in Birmingham (BHM), AL and a university-affiliated IF practice in Pittsburgh (PIT), PA (USA).
- At BHM, data were abstracted for all female patients with an initial consultation 01/01/2011 – 06/30/2012 who met study inclusion criteria.
- At PIT, a random sample of female patients with an initial consultation 01/01/2011 – 12/31/2011 was obtained and records were reviewed until 250 women meeting study inclusion criteria were identified.
- Medical record data were abstracted using a standardized form.
- STI history was based on self-report or screening done at IF evaluation. Pelvic inflammatory disease (PID) and ectopic pregnancy (EP) history were self-reported.
- Statistical tests were used to compare proportions (chi-square, Fisher's exact) and medians (Wilcoxon).

Inclusion and Exclusion Criteria

- Study inclusion criteria:
  - Age 19-42 years on date of new patient consultation
  - Presented to clinic with IF (failure to achieve an intrauterine pregnancy after ≥12 months of regular intercourse without the use of contraception)
- Study exclusion criteria:
  - History of tubal sterilization
  - Presented to clinic for artificial insemination or in vitro fertilization with donor sperm due to lack of a male partner or male partner with known IF

Case Definitions

- TFI constructed definition: evidence of unilateral or bilateral fallopian tube obstruction or damage as indicated by any of the following findings:
  - Laparoscopy: hydrosalpinx, tubal obstruction on dye test, peri-tubal or peri-ovarian adhesions, tubal fibrosis, fimbriae fragmented or unrecognizable
  - Hysterosalpingogram: lack of fill and free spill, tube not present
  - Pelvic ultrasound: hydrosalpinx
- TFI clinical diagnosis: Clinician listed TFI as a diagnosis in the medical record

Results

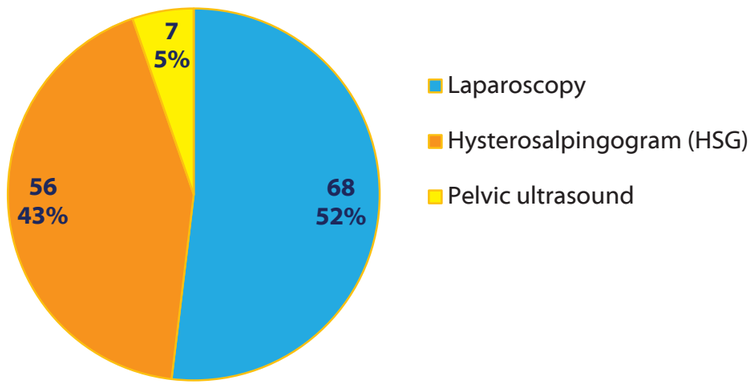
Table 1: Description of Study Population

	Birmingham N=413 n (%)	Pittsburgh N=251 n (%)
Age (median, IQR)	31 (28-35)	31 (28-35)
Race**		
Black	87 (21.1%)	26 (10.4%)
White non-Hispanic	303 (73.4%)	178 (70.9%)
Asian	13 (3.1%)	20 (8.0%)
Hispanic	10 (2.4%)	5 (2.0%)
American Indian / Alaska Native	0	5 (2.0%)
Missing	0	17 (6.8%)
History of live birth without use of IVF	118/411 (28.7%)	66/250 (26.4%)
Months trying to get pregnant* (median, IQR)**	30 (18-48)	24 (14-36)
≥1 visit after consultation**	370 (89.6%)	196 (78.1%)
Pelvic ultrasound performed +**	363 (87.9%)	81 (32.3%)
Hysterosalpingogram performed +	338 (81.8%)	181 (72.1%)
Laparoscopy performed +**	199 (48.2%)	51 (20.3%)

*At time of new patient consultation
+At past or current evaluation
**p<0.0001 for difference between sites

- Compared to BHM, a smaller proportion of patients at PIT were black, had at least one post-consultation visit, and had a pelvic ultrasound or laparoscopy done as part of their prior or current IF evaluation.
- BHM patients had been trying to get pregnant longer at the time of their new patient consultation than PIT patients.

Figure 1: Diagnostic studies* used to define TFI status



*Subjects could have >1 study (with concordant or discordant results). Subjects with evidence of TFI on laparoscopy were included in the laparoscopy category. Subjects with evidence of TFI on HSG but no result or no evidence of TFI on laparoscopy were included in the HSG category. Subjects with hydrosalpinx on pelvic ultrasound and no results or no evidence of TFI on the other 2 studies were included in the pelvic ultrasound category.

Table 2: Bivariate associations with race

	Race		
	Black (N=113) n (%)	Other Races (N=534) n (%)	p-value
CT (past/current)	16 (14.2%)	20 (3.7%)	<0.001
GC (past/current)	5 (4.4%)	4 (0.7%)	0.010
PID history	8 (7.1%)	9 (1.7%)	0.001
EP history	4 (3.5%)	27 (5.1%)	0.631
TFI*	36 (31.9%)	94 (17.6%)	<0.001

*Constructed definition

- Black patients were more likely than patients of other races to have a history of CT, GC, and PID noted in the medical record, and were more likely to have TFI.

Table 3: Bivariate associations with TFI

	TFI Constructed Definition			
	TFI N=131 n (%)	No TFI N=533 n (%)	Odds Ratio (95% CI)	p-value
Age (median)	32	31		0.043
Black Race	36/130 (27.7%)	77/517 (14.9%)	2.2 (1.4-3.4)	<0.001
CT (past/current)	8 (6.1%)	29 (5.4%)	1.1 (0.5-2.5)	0.766
GC (past/current)	2 (1.5%)	7 (1.3%)	1.2 (0.2-5.7)	0.693
PID History	9 (6.9%)	8 (1.5%)	4.8 (1.8-12.8)	0.002
EP History	18 (13.7%)	13 (2.4%)	6.4 (3.0-13.4)	<0.001

- A history of STIs and PID noted in the medical record was uncommon, even among patients with TFI.
- TFI was significantly associated with black race, and with having a history of PID and EP.
- Median age was slightly higher among patients with TFI.

Figure 2: Comparison of TFI Detection by Constructed Definition and Clinical Diagnosis

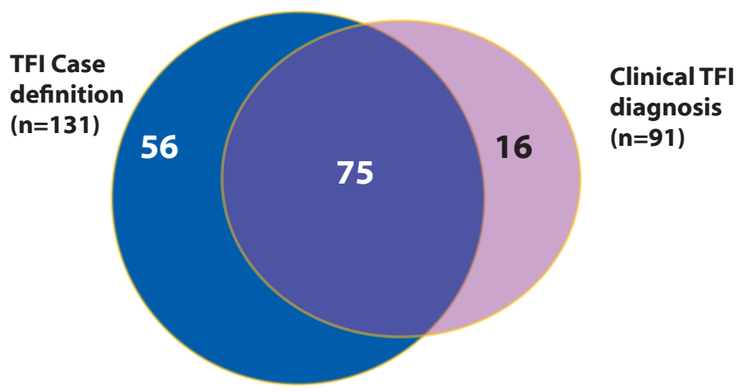
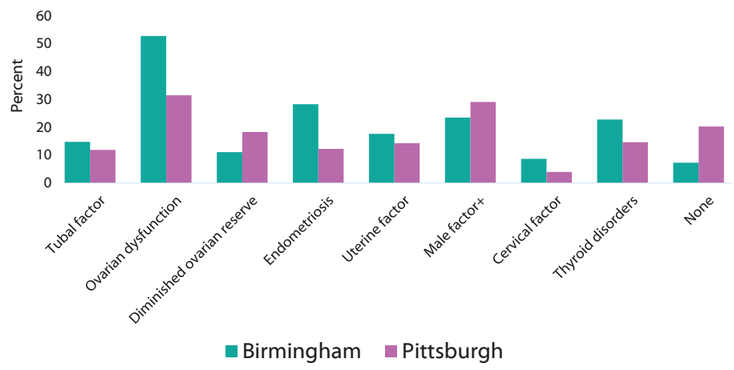


Figure 3: Clinical Infertility Diagnoses* by Study Site



*Diagnoses are not mutually exclusive.
+Among patients with a male factor IF diagnosis, 20% from BHM and 34% from PIT had no other specific IF diagnosis.

- 15% of patients at BHM and 12% at PIT had a clinical TFI diagnosis.
- Excluding patients with no specific IF diagnosis or only a male factor IF diagnosis, the proportion of patients with a clinical TFI diagnosis increased to 17% at each site.

Limitations

- Assessments made at the IF clinic level are unable to detect unrecognized IF and IF among women who do not access IF clinic care. Access to care differs by race and socioeconomic status.
- Women seeking initial consultation had variable duration of time in care and thus variable opportunity for specific IF diagnosis.
- Diagnostic studies that are most accurate for detection of TFI are expensive, invasive or uncomfortable, and may not be covered by insurance. Clinicians may not request these studies if the results are not expected to impact the patient's treatment plan.
- History of STIs and PID were based on patient self-report as documented in the medical record. Subclinical infections and episodes that were unrecognized, undiagnosed, or unreported were not detected.
- Results may not be generalizable to other patient populations.

Conclusions

- TFI was identified in 20% of IF patients using the constructed definition and in 14% using clinical TFI diagnosis.
- Noted history of CT, GC, and PID were uncommon, even among patients with TFI, but associated with black race.
- TFI was almost twice as common among black patients as compared to patients of other races, and was associated with PID and EP history.
- Patients with TFI were slightly older at time of consultation than other IF clinic patients.

Implications

- Studies using biological measures of exposure (e.g., serology) are needed to better define the proportion of TFI attributable to STIs.
- Assessment of TFI burden is challenging and likely to be impacted by choice of case definition.

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