Sexually Transmitted Diseases, a cause of infertility in males

By
Dr Oluseyi Temowo
Venerology Department
General Hospital, Lagos, Nigeria

Tutor
Dr Francis Ndowa
Controlling Sexually Transmitted and Reproductive Tract Infections Team
World Health Organization

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What is STD?

A. Sexually Transmitted Diseases are infections/ syndromes that are contacted as a result of sexual intercourse

B. May affect:
(i) mostly genital tract i.e. *N. gonorrhoeae, C. trachomatis*

or
(ii) could be general/systemic in nature i.e. HIV

(in this review we focused on genital tract infections in males)

BACKGROUND

- STD is a public health problem in most parts of the world
- Prevalence has regional variations
- Failure of diagnosis and treatment at early stage → serious sequelae i.e. infertility, fetal wastage, anogenital cancer, ectopic pregnancy, neonatal infections and premature deaths (WHO 2001)

INFERTILITY

- Affects men and women everywhere in the world
- About 8% of couples experience infertility problems during their reproductive lives; when extrapolated to global population, 80 million have infertility problems (WHO, 1993)
- The inability of a couple to conceive after 12 months of intercourse without the use of contraception

MALE INFERTILITY

Recent findings showed male factor to be about 30-50%

WHO, 1988

Infertility cause	Percentage occurrence
Female cause only	35%
Male cause only	25%
Cause found in both	24%
No cause	16%

Adapted from: A. Campana 2004, Postgraduate lecture GFMER, Geneva

OBJECTIVES OF THE REVIEW

1. To identify STD as a common problem among males, especially young adult male populations, and the determinants of its prevalence

2. To identify that STD (genital tract infections) in males commonly cause infertility

3. To suggest possible areas of research for management of STD in this population, thus addressing the socio-economic and medical impacts on infertility

METHODOLOGY

Extensive search using various articles available on the topic since 1974-2004 (30 years)

↓ WHO electronic database (Medline, Cochrane databases)

↓ Manually looking for journals in WHO Library after detecting abstract on article

↓ Publications, lectures and position statements

(70 articles were found based on the relevance to the topic)

OUTCOMES

1. STD is common among young adult males with epidemiological variation
2. STD could be asymptomatic in males and could subsequently lead to infertility
3. Sperm parameters are ultimately altered leading to infertility
4. Extensive research needed to elucidate mechanism of injury

PREVALENCE OF STD IN MALES: INDIVIDUAL

Socio-economic status	→	Poverty/joblessness
Sexual habit	→	Multiple sex partners, visiting commercial sex workers, drug abuse, homosexuals
Occupations	→	Mariners, long-distance truck drivers, police/military

PREVALENCE OF STD IN MALES: POPULATION

Age	→	Common in young age groups (15-44 years)
Development	→	Poorly developed areas within a community
Socio-economic	→	Urban centres with more single/unmarried males. In tourist regions
Health Care	→	Poor accessibility, non-availability, cost, poor diagnostic aids, quality of training of health personnel

STD AND MALE INFERTILITY

↓ Incidence uncertain due to lack of suitable diagnostic criteria and sometimes infections are asymptomatic

↓ Progressive damage to reproductive organs and alteration of its functions: mostly unnoticed by the patient or undetected by the physician

COMMON PATHOGENS INVOLVED

Mostly:

↓ *Neisseria gonorrhoeae*

↓ *Chlamydia trachomatis*

↓ *Ureaplasma urealyticum*

Sometimes:

↓ Adeno-associated (AA) viruses e.g. HPV, cytomegalovirus

↓ Mycobacterium (Moheb et al, Egypt)

MECHANISM OF INJURY

A. **Direct Damage:**

Causing stricture, epididymal damage to outflow tract leading to low sperm counts (Oligo/Azoospermia)

B. **Humoural:**

Antibodies production, localized genital immune response to pathogens may lead to formation of bacterial membrane carbohydrate-directed antibodies cross-reacting with carbohydrate on sperm surface

CELL-MEDIATED FACTOR

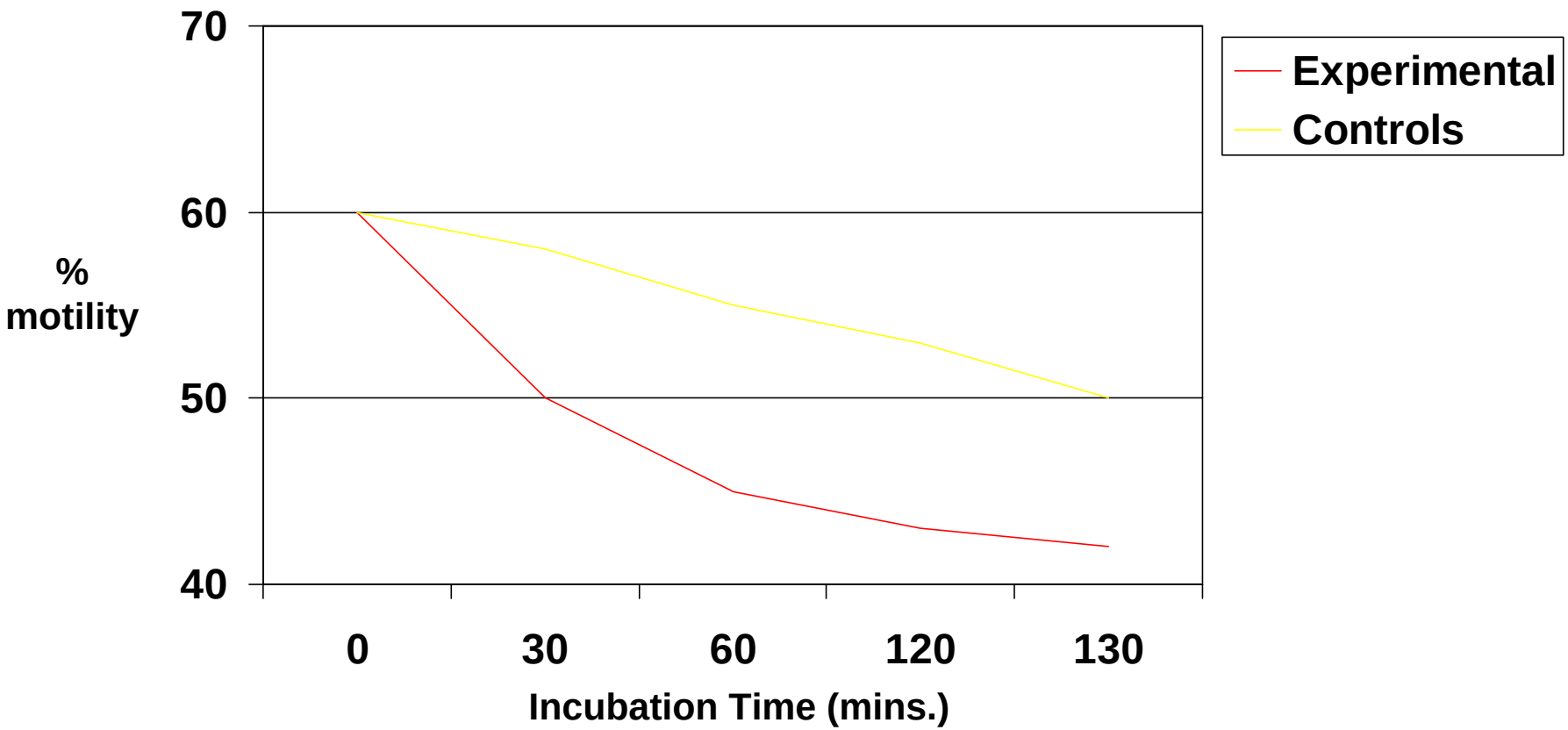
- ↓ Cytokines and soluble receptors are produced in seminal fluid during inflammation
- ↓ The cytokines (IL-8, IFN-γ, TNF-α) are associated with increased level of reactive oxygen species (ROS) which subsequently damage spermatozoa via lipid peroxidation
- ↓ Lipid peroxidation disturbs membrane fluidity, membrane enzymes (Na-K ATPASE), including spermatozoa capacitation, acrosome reaction and ovocyte function

EFFECTS OF ANTISPERM ANTIBODIES ON FERTILITY IN MEN

Diagnosis	Sperm Antibody	N°	N° of Pregnancies/%
Infection	+	15	1 (7)
Infection	-	15	6 (40)
Urethritis prostatitis	+	8	2 (25)
Urethritis prostatitis	-	9	6 (67)
Varicocele	+	3	0
Varicocele	-	7	4 (57)
All 100 men	+	34	4 (12)
All 100 men	-	66	19 (28)

Witkin and Toth, 1983, fertility and sterility 40(6) 1983 (Dec)

EFFECTS OF CYTOKINES ON SPERM PARAMETERS
(motility, viability and membrane integrity of spermatozoa)



Effects of LPS and IFN-γ in combination on human sperm motility at different incubation times (Suresh et al 2001)

SOCIOECONOMIC IMPACTS

- 8% of couples infertile world wide, affects world development
- Childbearing important as mark of success in marriage, especially in some places in Africa
- Medically: cost of corrective surgeries on damaged tract, increased recurrence rates due to poor health care
- Financial burden of ART and sometimes poor outcome despite good techniques

RESEARCH

- To elucidate mechanistic approach to inflammatory concepts
- Use of valid techniques for identification of organisms needs further study
  e.g. polymerase chain reaction,
  rectal ultrasounds
- Further studies required on the use of antibiotics to treat asymptomatic males with infertility

CONCLUSION

- STD more prevalent in young male adults
- STD causes infertility in males due to ignorance of the patient and lack of health care facilities in some regions
- Imprecision of existing diagnostic facilities
- Lastly, infertility may persist, even with the use of ART; the answer may be the prevention and adequate treatment of STD ab initio in males

THANK YOU