

African Journal of Medicine and Medical Sciences

Editor: O.A. Ladipo
Assistant Editors:
B.O. Osotimehin and A.O. Uwaifo

Volume 18
1989

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Infective factors of male infertility among Nigerians

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Summary

Seminal fluid from 782 Nigerian males with complaints of infertility were examined with respect to infective agents and indices such as sperm count, motility and the presence of a significant number of pus cells. Various infective agents were recovered from 54 (7%) of the patients, while in 25% of the remaining patients, a significant number of pus cells was present, with associated abnormal seminal fluid indices. Our findings indicate that seminal fluids constitute an important medium for the spread of various infective agents, and that genital infections by these infective agents, sexually and non-sexually transmitted, may be responsible for a good percentage of infertility cases in Nigerian males.

Résumé

Fluides séminaux provenant des 782 Nigériens qui se plaignaient de la stérilité ont été examinés afin de déterminer les agents infectieux et les indices tels que le comptage de sperme, la motilité et la présence du pus dans les cellules. 54 (soit 7%) de ces patients souffraient des agents infectieux divers alors que 25%, bien que ne révélant aucun agent infectieux, possédaient, cependant, assez de pus dans les cellules, pus caractéristique des indices du fluide séminal normal de comptage et de motilité. Nos conclusions montrent que, dans plusieurs cas de stérilité, l'homme en est responsable et que les infections génitales transmises sexuellement ou non par les agents infectieux semblent être responsables du pourcentage de ces cas au Nigéria.

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Introduction

The whole problem of infertility, especially in tropical Africa, is a serious and sensitive issue, mostly because of its immense socio-cultural implications. Although the woman is usually blamed when a couple cannot have children, the male is responsible in many cases [1]. In an infertility clinic in the Federal capital of Lagos, it was reported that 40% of the husbands were infertile, with oligospermia or azoospermia [2], while in Ibadan, Awojobi *et al.* [3] found oligospermia or azoospermia associated with chronic epididymitis in 32% of infertile males. Although several factors affect fertility in man, perhaps the most common preventable cause of infertility is infection of the genital area by various micro-organisms, which spread to involve not only the reproductive organs but also the conducting pathway.

Within the last few years, there has been a dramatic upsurge in the number of infertile males that present at the Special Treatment Clinic, University College Hospital, Ibadan, Nigeria, for seminal fluid analysis. This paper reports on the various infective factors associated with this condition over a 10-year period, thereby highlighting the role of genital infections, sexually and non-sexually transmitted, in the production of infertility states in males in Nigeria.

Subjects and methods

This study is based on seminal fluid analysis of males who present with infertility at the Special Treatment Clinic, University College Hospital, Ibadan, over a 10-year period (1975–1984). The results exclude all analyses carried out as follow-up of previous subjects or data from men who were fertile but merely presented as a result of anxiety from genito-urinary symptoms.

The subjects were required to abstain from sexual intercourse for at least 4 days before production of seminal fluids for examination, then collection was into sterile plastic containers using either masturbation or coitus interruptus. The samples were delivered within 1 h of production and immediate processing was carried out with respect to volume, count, motility, wet film examination and Gram stain. Additional standard cultural procedures and biochemical tests were carried out with respect to the gonococcus and the facultative anaerobic organisms. Presence and number per high-power field of pus cells and red blood cells were also noted. A subject was considered to have oligospermia if the sperm count per millilitre was less than 20×10^6 ; while azoospermia was taken as the complete absence of spermatozoa in a subject's seminal fluid.

Relevant clinical data of subjects were obtained from the medical records.

Results

A total of 782 seminal fluid specimens were examined from infertile men over the 10-year study period. Fifty-four of the 782 specimens (7%) had various infective agents isolated (Table 1), while 25% of the remaining specimens had evidence of infection by the presence of a significant number of pus cells (≥ 5 /high-power field). A significant proportion of these showed quantitative and/or qualitative abnormality of the seminal fluids (Table 2). Five hundred and sixty-two specimens (72%) had sperm counts of $< 20 \times 10^6$ /ml, while 622 speci-

mens (80%) had sperm motility of $< 50\%$. There was only 1 specimen in which no pus cells were found but an infective agent (i.e. *Candida* spp.) was isolated. Two subjects were found to have dual infection of gonorrhoea and trichomoniasis. Most of the subjects showed no specific urethral symptoms at the time of examination although they gave details of previous genital infection. Also, most of these subjects had received several courses of numerous different antibiotics through self prescription, advice of chemist or 'quack', mostly inappropriately or at inadequate doses.

Discussion

Fifty-four (7%) of all the specimens examined contained infective agents (Table 2). These included 12 cases of *Neisseria gonorrhoea* (with three of them β -lactamase producing), and 23 cases of a combination of Gram-positive cocci (i.e. *Staphylococcus aureus*) and Gram-negative bacilli (such as *Escherichia coli*, *Klebsiella* spp., *Pseudomonas* spp. and *Proteus* spp.). In all these cases, significant pus cells were found, in addition to abnormal seminal fluid indices of sperm count and motility. Complications of gonococcal urethritis, such as epididymitis and epididymo-orchitis, are commonly seen in Nigerians, and these could lead to both testicular damage as well as tube blockage and consequent oligospermia or azoospermia. Similarly, secretions from infected prostate and seminal vesicles could create a hostile medium for spermatozoa. Although usually secondary invaders, Gram-positive and Gram-negative organisms could become pathogenically important in previously damaged mucosal epithelium and could give rise to similar sequelae as above.

A significant number of specimens in the study contained a significant number of pus cells associated with abnormality of the seminal fluids, and yet in none of them was any infective agent found. Information given by the patients themselves indicated previous genital infections inadequately managed or not managed at all. Although chlamydia and mycoplasma were not looked for (for lack of necessary facilities), we believe that a number of infections might be due to these micro-organisms. Over 50% of male patients seen with sexually transmitted diseases in Ibadan have non-gonococcal

Table 1. Results of seminal fluids examination

No. examined	782
No. found with infective agents	54
No. with evidence of infection* (i.e. pus cells ≥ 5 /HPF)	221
No. with $< 20 \times 10^6$ /ml count	562
No. with $< 50\%$ motility	622
No. with infective agent but no pus cell	1
No. with no pus cells at all	30

At ≥ 5 /HPF, 72% and 86% showed $< 50\%$ sperm motility and a sperm count of $< 20 \times 10^6$ /ml, respectively.

**Candida* spp.

Table 2. Infective agents isolated in relation to seminal fluid indices

Infective agents	Sperm indices			Significant pus ($\geq 5/\text{HPF}$)
	Number ($< 20 \times 10^6$)	Count ($< 50\%$)	motility ($< 50\%$)	
<i>Neisseria gonorrhoea</i>	12	5	6	12
<i>Trichomonas vaginalis</i>	6	4	5	6
<i>Candida</i> spp.	11	6	7	10
Gram-positive cocci (11)	23	19	13	23
Gram-negative bacilli (12)				
<i>Schistosoma haematobium</i>	2	1	1	2

urethritis [4]. Complications arising from these infections are similar to those of gonococcal genital infections, and had similar sequelae.

Six cases of trichomoniasis were encountered, out of which two were associated with gonorrhoea. Three of the six patients were azoospermic and the remaining four were oligospermic. An azoospermic Nigerian male patient with trichomonas urethritis, whose seminal fluid contained numerous *Trichomonas vaginalis*, had been reported [5]. Phagocytic properties of trichomonads have been described [6], also the inhibition of spermatozoan motility by toxic products of this parasite [7], both of which can play a part in conjugal infertility.

Urethritis due to *Candida albicans* and related yeasts is well recognized. Twenty per cent of males investigated for urethritis in Ibadan had urethral candidiasis [8]. Candidal invasion of posterior urethra is recognized, and prostatic involvement has also been recorded [9]. Therefore, there is the possibility that infertility may arise from this.

There were two cases in which *Schistosoma haematobium* ova were found in the seminal fluid, and in both cases there was a significant number of pus cells and abnormality of the seminal fluids. There were no ova found in their urine at the time of presentation. Several case reports have been published from Africa describing schistosomal involvement of the epididymis with chronic granulomatous formation [10], but whether localization in the epididymis would lead to infertility remains to be fully established. In a fairly large number of cases of schistosomal seminal vesiculitis reported from Egypt [11], no evidence of obstruction was found.

Other unusual infective agents of infertility have similarly been described, especially in tropical Africa, although they were not encountered in this study. These agents include filaria [12], *Mycobacterium leprae* [13] and *Mycobacterium tuberculosis* [14,15]. There is growing evidence that a variety of these parasites localize in the vessels and tissues of the genital tract, with production of local pathological changes that may lead to infertility.

The problem of infertility in tropical Africa is further compounded by a variety of factors. There is a high prevalence of infective conditions with genital involvement, apart from sexually transmitted diseases, that are now assuming epidemic proportions in many areas.

The general shortage of personnel, as well as inadequacy of diagnostic and management facilities, is made worse by ever increasing drug costs and anti-microbial drug resistance. Ironically, even with treatments, results have not been impressive [16]. In order to prevent further worsening of this situation, necessary attention and priority need be given to the whole problem of infertility in Africa.

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(Accepted 11 August 1987)

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