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Male Infertility at the University Teaching Hospital of Bogodogo, Ouagadougou, Burkina Faso: Epidemiological, Clinical and Paraclinical Profile of 278 Cases

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Abstract

Context: Infertility is a public health problem. Although in our society, infertility is usually attributed to the female gender, current knowledge also incriminates the male. Few studies have looked at the male profile in particular. The aim of our study is to investigate the profile of male infertility during the campaign initiated in the Department of Obstetrics and Reproductive Medicine of the University Teaching Hospital of Bogodogo (UTH-B) to recruit hypofertile couples with a view to inaugurating assisted reproduction activities. **Objective:** To study the profile of male infertility in a cohort of hypofertile couples in the city of Ouagadougou from December 2022 to June 2023. **Methodology:** This was a descriptive and analytical cross-sectional study conducted in the city of Ouagadougou from December 2022 to June 2023 among patients consulting for hypofertility in the Gynecology, Obstetrics and Reproductive Medicine Department of the Bogodogo University Teaching Hospital. **Results:** The prevalence of male infertility was estimated at 71.28%. The mean age was 42.78 years, with extremes ranging from 26 to 63 years. The 45-50 age group was the most represented. Primary infertility accounted for 73.50% versus 26.50% for secondary infertility. Causes of quantitative sperm origin were the most common, namely oligospermia (17.16%) and azoospermia (16.79%), followed by qualitative abnormalities such as morphology (12.68%) and motility (11.56%). Oligospermia, asthenospermia and teratospermia (OATS) were associated in 47 patients (17.54%), and oligospermia and asthenospermia in 27 patients

(10.07%). Associated factors were age, alcohol and tobacco consumption, BMI and high-risk professions (baker, gold digger and driver). **Conclusion:** Men are also responsible for more than 50% of couples' hypofertility, and there are a variety of causes, with well-identified risk factors. A careful approach is essential to ensure that the couple receives adequate and appropriate care.

Keywords

Male Infertility, Spermogram, Spermocytogram, Hormones, Testicular Ultrasound, Assisted Reproduction, UTH-B, Ouagadougou

1. Introduction

Infertility is a disorder of the male or female reproductive system defined by the inability to achieve pregnancy after 12 months or more of regular unprotected sexual intercourse [1]. It has complex moral repercussions on the individual, the family and even society. According to recent World Health Organization (WHO) studies, 10% - 15% of couples worldwide are affected [2].

Infertility affects around 80 million people worldwide, and approximately one couple in six is faced with primary or secondary infertility [3].

In France, the prevalence of infertility is 15%, and 1 in 4 to 6 couples is affected by infertility for one year [3].

This condition therefore constitutes a public health problem, due to its prevalence, its impact on physical and mental health and, above all, the difficulties inherent in its management.

In Burkina Faso, the prevalence of infertility was 17.76% in 2016 [4]. In our society, infertility in couples is readily attributed to the female gender, which undergoes most of the investigations in the first place, whereas current knowledge also incriminates the male. Studies on infertility are available in our country, but few have focused on the male profile in particular [5] [6]. With this in mind, we proposed to study the profile of male infertility during the campaign initiated in Burkina Faso, through the University Teaching Hospital of Bogodogo and its gynecology, obstetrics and reproductive medicine department to recruit hypofertile couples with a view to inaugurating the service of Medically Assisted Procreation (MAP) which, until then, had only been available in private structures at high cost [5] [6].

2. Patients and Methods

2.1. Type of Study

This was a descriptive and analytical cross-sectional study. It was conducted at the University Teaching Hospitals of Bogodogo (UTH-B) and involved four departments, namely:

(1) The Gynecology, obstetrics and Reproductive Medicine Department.

(2) The Histology-Embryology Cytogenetics and Reproductive Biology Depart-

ment.

(3) The Medical Biology Laboratories Department.

(4) And the Imaging and Interventional Radiology Department.

2.2. Study Population

The study concerned patients followed up for hypofertility during this campaign.

2.3. Selection Criteria

Sampling

Sampling technique:

This was an exhaustive sampling: all patients admitted to the department during the study period who met the inclusion criteria were included in the sample.

Sample size:

Assuming a margin of error (i) of 5% and a confidence level of 95%, the corresponding z-statistic at our confidence level is 1.96. A 2015 study in Central and Eastern Europe found a frequency of male hypofertility equal to 12% [7]. Using Schwartz's formula

$$n = t^2 \times p \times q / m^2$$

Digital application:

t = 1.96; p = 12%; q = 1-p; m = 0.05 (absolute accuracy) [7]

$$n = 1.96^2 \times 0.12\left(0.88/0.05^2\right)$$

n = 162

We obtained a minimum necessary patient size of 162. To ensure the power of our study, we extended our sample size to 298 patients.

2.4. Inclusion Criteria

Patients meeting the following criteria were included in our sample:

(1) they must be male;

(1) they must have given their consent;

(3) they must have been consulted for hypofertility;

(4) they must have reported their biological, cytological and morphological tests;

(5) they must have had abnormalities in the tests carried out.

2.5. Criteria for Non-Inclusion

Patients meeting the following criteria were not included in our sample:

(1) Refusal to take part in the study;

(1) Failure to return all complementary examinations;

(3) No abnormalities detected during explorations.

2.6. Data Collection and Processing

The data collection technique was based on a data collection form.

2.7. Method of Collection

The source of the data was the medical records drawn up at the time of the couples' consultation from December 2022 to June 2023.

2.8. Variables Measured

The variables collected were as follows:

(1) Sociodemographic characteristics (age, occupation, marital status, education level, residence);

(2) Provenance (urban or rural);

(3) Medical and surgical history;

(4) eating habits;

(5) Previous treatment;

(6) Clinical examination: blood pressure, Body mass index (BMI);

(7) Results of paraclinical examinations (testicular ultrasound, FSH, LH, testosterone, prolactin, TSH).

These variables were collected on data sheets.

2.9. Processing Software

The manually collected data were entered, processed and analyzed on computer, using Word, Excel version 2016 and Epi info version 7.2.5.0.

Data analysis was performed at 3 levels:

(1) Descriptive analysis: consisted in calculating percentages for qualitative variables and measures of central tendency (mean) for quantitative variables;

(2) Univariate analysis: the Chi-square test was used to compare percentages; when the conditions for applying the test were not met, Fisher's exact test was used;

(3) Multivariate analysis using logistic regression.

A p threshold of less than 0.05 was considered significant; the Odds ratio was used as a measure of association with a 95% confidence interval.

2.10. Operational Definitions

In our study, any patient in whom one of the following elements had been highlighted was considered as male infertility:

(1) Any significant anatomical abnormality of the genital tract that could interfere with the production of male gamete;

(2) Any hormonal biological abnormality (FSH, LH, testosterone, prolactin, TSH....) that could alter the functioning of the female genital tract.

3. Results

3.1. Prevalence of Male Hypofrtility

During the campaign, 1,200 couples consulted us for hypofertility, 376 of whom reported their assessments. Of these 376 couples, we recorded 268 cases of male

hypofertility, 221 of mixed origin and 47 of male origin, giving a prevalence of male hypofertility of 71.28%.

3.2. Sample Characteristics

In our cohort, men aged 30 to 5 years represented 77.61% of the sample. They were married in 83.96% of cases, drivers in 11.57% of cases and consumers of alcohol or tobacco in 61.95% of cases. Descriptive analysis of sociodemographic and clinical characteristics is shown in Table 1.

Table 1. Descriptive analysis of sociodemographic and clinical characteristics (n = 268).

Variables	Headcounts	Percentages (%)
Age		
<30 Years	6	2.24
30 years - 50 years	208	77.61
≥50 years	54	20.15
Marital status		
Married	225	83.96
Single	6	2.24
Common-law	37	13.80
Residence		
Urban	245	91.45
Rural	23	8.55
Profession		
Employee	123	45.90
Shopkeeper	58	21.64
Baker	15	5.60
Goldsmith	27	10.07
Driver	31	11.57
Pupil/student	14	5.22
Characteristics of hypofertility		
Primary	197	73.50
Secondary	71	26.50
Duration of hypofertility		
<5 years	54	20.15
5 years - 15 years	167	62.31
≥15 years	47	17.54
Medical history		
None	162	60.45
HTA	81	30.22

Continued

Mumps	13	4.85
Diabetes	8	2.99
Bilharzia	4	1.49
Surgical history		
Varicocele surgery	34	50.75
Inguinal hernia	22	32.84
Epididymal surgery	1	1.49
Cryptorchidism	9	13.43
Contraceptive vasectomy	1	1.49
Habits and lifestyle		
No alcohol	102	38.05
Alcohol	88	32.84
Tobacco	46	17.16
Alcohol/tobacco	32	11.95
BMI		
Normal weight	71	26.49
Overweight	101	37.69
Obese	96	35.82
Examination of the penis		
Normal	243	90.67
Clinical varicocele	19	7.01
Hydrocele	6	2.32

3.3. Paraclinical Examinations

3.3.1. Biological Abnormalities

In our sample:

(1) FSH was normal in 59.70% of patients;

(2) LH was normal in 205 patients or 76.49%;

(3) Testosterone was lowered 26.12%;

(4) Prolactin was normal in 59.33%.

The descriptive study of hormone levels and testicular ultrasound is shown in Table 2.

Table 2. Descriptive study of hormonal assessment and testicular ultrasound (n = 268).

Variables	Headcounts	Percentages (%)
FSH		
Normal	160	59.70
High	85	31.71

Continued

Low	23	8.59
LH		
Normal	205	76.49
High	33	12.31
Low	30	11.5
Prolactin		
Normal	159	59.33
High	76	28.36
Low Prolactin	33	12.31
Testosterone		
Normal	198	73.88
Low	70	26.12
Testicular ultrasound		
Normal	107	39.93
Varicocele	65	24.25
Hypotrophy/testicular atrophy	70	26.12
Hydrocele	17	6.34
Epididymal nodule and cyst	9	3.36

3.3.2. Sperm Abnormalities

In our cohort, sperm quantity abnormalities were the most observed, including oligospermia in 46 patients and azoospermia in 45 patients. An association of two disturbances (oligoasthenospermia) was found in 27 patients and an association of three abnormalities in 47 patients, namely OligoAsthenoTeratoSpermia (OATS). The descriptive study of the spermogram is shown in Table 3.

Table 3. Descriptive study of spermograms (n = 268).

Anomaly	Headcount	Percentage %
PH		
High	96	35.82
Low	14	5.22
Normal	158	58.96
Volume		
Hypospermia < 1.5 ml	18	6.72
Hyperspermia > 6 ml	03	1.12
Concentration (oligospermia)		
Concentration/ml <15 millions	84	31.34
Concentration/ejaculate < 39 millions	47	17.54

Continued

No SPZ (azoospermia)	45	16.79
Mobility < 32% (asthenospermia)	105	39.18
Vitality < 68% (necrozoospermia)	27	10.07
Morphology or spermocytogram (teratospermia)		
Head abnormality	26	9.7
Midpiece anomaly	09	3.36
Flagellum anomaly	12	4.48
Unspecified	34	12.69
Leukocytes		
<100000/ml	261	97.39
> 100000/ml	07	2.61

3.4. Analysis of Associated Factors

3.4.1. Analysis of Factors Associated with Oligospermia

The analysis of factors associated with oligospermia is shown in Table 4.

Table 4. Analysis of factors associated with oligospermia.

Variables	Univariate analysis		Multivariate analysis	
	OR	Value of P	OR	Value of P
Age < 45 ≥ 45	0.1 [0.18 - 0.68]	0.0001	0.360 [1.30 - 4.50]	0.010
Profession At risk Not at risk	0.200	0.120		
Residence Urban Rural	0.861	0.542		
Surgical history				
Varicocele	1.200	0.231		
Inguinal hernia/cryptorchidism	0.767	0.590		
Other	1.147	0.861		
Consumption Alcohol/tobacco None	2.544 [1.32 - 5.029]	0.010	1.020 [0.04 - 1.47]	0.063
BMI Normal High	7.9056 [2.7 - 50.30]	0.0001	2.246 [0.34 - 0.99]	0.004

Continued

FSH				
Normal Anormal	0.360	0.101		
LH				
Normal Anormal	0.17 3	0.070		
Prolactin				
Normal Anormal	0.205 [0.11 - 0.18]	0.001	0.620 [0.17 - 1.15]	0.300
Testosterone				
Normal Anormal	0.167 0.061			
Testicular ultrasound				
Varicocele	0.065	0.412		
Testicular hypotrophy/atrophy	7.076 [1.4 - 10.8]	0.034	0.87 [0.74 - 3.99]	0.060
Others	2.743	0.790		

3.4.2. Analysis of Factors Associated with Azoospermia

The analysis of factors associated with azoospermia is shown in (Table 5).

Table 5. Factors associated with azoospermia.

Variables	Univariate analysis		Multivariate analysis	
	OR	Value of P	OR	Value of P
Age				
< 45 ≥ 45	0.932	0.860		
Profession				
At risk Not at risk	6.06 [2.93 - 12.54]	0.0001	1.58 [0.96 - 21.04]	0.187
Residence				
Urban Rural	0.333	0.116		
Surgical History				
Varicocele surgery	1.450	0.398		
Inguinal hernia/cryptorchidism	3.360 [3.40 - 17.03]	0.001	0.12 [0.12 - 3.04]	0.074
Others	1.784	0.182		
Consumption				
Alcohol/tobacco None	0.105	0.080		

Continued

BMI				
Normal High	1.780	0.980		
FSH				
Normal Anormal	9.900 [1.97 - 102.2]	0.0001	0.36 [1.00 - 2.46]	0.038
LH				
Normal Anormal	0.336	0.070		
Prolactin				
Normal Anormal	3.83 [1.08 - 9.00]	0.001	1.45 [0.22 - 12.60]	0.801
Testosterone				
Normal Anormal	0.406	0.644		
Testicular ultrasound				
Varicocele	2.87	0.98		
Testicular hypotrophy/atrophy	4.87 [3.10 - 32.67]	0.001	1.00 [0.33 - 6.99]	0.089
Others	0.198	0.204		

3.4.3. Analysis of Factors Associated with Asthenospermia

The analysis of factors associated with asthenospermia is shown in (Table 6).

Table 6. Factors associated with asthenospemia.

Variables	Univariate analysis		Multivariate analysis	
	OR	Value of P	OR	Value of P
Age				
< 45 ≥ 45	2.94 [0.10 - 0.74]	0.018	1.67 [0.34 - 1.32]	0.180
Profession				
At risk Not at risk	1.160	0.120		
Residence				
Urban Rural	1.113	0.116		
Surgical history				
Varicocele surgery	1.948	0.84		
Inguinal hernia/cryptorchidism	1.350	0.826		
Others	1.067	0.661		
Consumption				

Continued

Alcohol/tobacco None	22.28 [2.99 - 166.11]	0.0001	0.800 [0.49 - 2.32]	0.978
BMI				
Normal High	1.610	0.060		
FSH				
Normal Anormal	1.734	0.100		
LH				
Normal Anormal	2.748	0.091		
Prolactin				
Normal Anormal	1.704	0.080		
Testosterone				
Normal Anormal	0.904	0.366		
Testicular ultrasound				
Varicocele	1.094	0.816		
Testicular hypotrophy/atrophy	1.900	0.700		
Others	1.0007	0.567		

3.4.4. Analysis of Factors Associated with Necrospermia

The analysis of factors associated with necrospermia is shown in Table 7.

Table 7. Factors associated with necrospermia.

Variables	Univariate analysis		Multivariate analysis	
	OR	Value of P	OR	Value of P
Age				
< 45 ≥ 45	1.770	0.088		
Profession				
At risk Not at risk	1.698	0.460		
Residence				
Urban Rural	1.007	0.344		
Surgical history				
Varicocele surgery	1.000	0.400		
Inguinal hernia/cryptorchidism	1.659	0.904		

Continued

Others	2.924	0.071
Consumption		
Alcohol/tobacco None	1.854	0.120
BMI		
Normal High	2.573	0.060
FSH		
Normal Anormal	2.578	0.059
LH		
Normal Anormal	1.453	0.082
Prolactin		
Normal Anormal	0.845	0.412
Testosterone		
Normal Anormal	1.739	0.061
Testicular ultrasound		
Varicocele	0.529	0.329
Testicular hypotrophy/atrophy	1.543	0.700
Others	1.098	0.094

3.4.5. Analysis of Factors Associated with Teratospermia

The analysis of factors associated with teratospermia is shown in (Table 8).

Table 8. Factors associated with teratospermia.

Variables	Univariate analysis		Multivariate analysis	
	OR	Value of P	OR	Value of P
Age				
< 45 ≥ 45	2.03 [1.68 - 11.92]	0.0001	0.865 [0.94 - 1.80]	0.085
Profession				
At risk Not at risk	3.055 [1.82 - 6.97]	0.0060	1.213 [0.096 – 7.32]	0.075
Residence				
Urban Rural	1.986	0.209		
Surgical history				
Varicocele surgery	1.214	0.077		

Continued

Inguinal hernia/cryptorchidism	0.011	0.598
Others	1.666	0.204
Consumption		
Alcohol/tobacco None	0.070	0.258
BMI		
Normal High	1.980	0.1000
FSH		
Normal Anormal	2.600	0.404
LH		
Normal Anormal	1.002	0.134
Prolactin		
Normal Anormal	1.567	0.390
Testosterone		
Normal Anormal	0.570	0.200
Testicular ultrasound		
Varicocele	0.238	0.250
Testicular hypotrophy/atrophy	1.002	0.070
Others	0.231	0.232

4. Discussion

4.1. Limitations, Difficulties and Biases of the Study

Paraclinical examinations were not carried out by all couples. Indeed, during our study period, 1,200 couples consulted for subfertility but we were only able to include 376 in the study due to the lack of paraclinical assessments. This is explained by the high cost of these different radiological and hormonal examinations and also by the demotivation of some couples, in this relentless race to have a child. Our data was collected from the files written during the consultation, and some of these files were insufficiently detailed, particularly regarding the clinical examination. Another difficulty came from the fact that the additional tests were carried out in different laboratories depending on the patients' choice. This posed enormous difficulties for comparing figures because the reference values varied from one laboratory to another. Also, our study was limited to couples who consulted at UTH-B during the campaign. This could create a bias in the full extrapolation to the entire Burkinabe population.

4.2. Prevalence of Hypofertility

Male infertility accounts for 20% of the causes of infertility in couples, and is involved in association with a female cause in 30 to 40% of infertile couples [8]. In our study of 376 couples, hypofertility was attributable to the man alone in 12.5% of cases, and of mixed origin in 58.78%, giving a prevalence of male hypofertility equal to 71.28% (268 patients). Our results are higher than those reported by Dohle *et al.* in Europe and Djiré in Mali, which were 60% and 46.67% respectively [9]. In Morocco, in a series involving 1265 couples, male origin was recorded in 45.2% [10].

This difference could be explained by the fact that current knowledge also incriminates the man in male infertility, and he is subject to more extensive clinical and paraclinical investigations.

4.2. Sociodemographical Characteristics

Married couples represented the majority of our study population, with a rate of 83.96%. Our results are similar to those of Niang *et al.* in Senegal, who reported 83.10% married couples [11]. The desire to have a child takes on its full meaning in marriage, which could explain this high rate.

Drivers, gold miners and bakers with 11.57%, 10.07% and 5.60% respectively. Our results are close to those of Niang *et al.* [11] in Senegal, who reported 5% drivers. In these professions, studies have reported a blood circulatory deficit linked to prolonged sitting, as well as the heating of testicles exposed to high temperatures, which can have a real impact on the quality of spermatogenesis and induce sterility [12] [13].

4.3. Clinical and Paraclinical Examinations

Primary hypofertility predominated, with a rate of 73.50%, compared with 26.50% for secondary hypofertility. This may be explained by the fact that couples are more likely to seek help when they have no children. Our results are close to those of Benksim *et al.* [14], who report a rate of 67.37%.

Mumps and bilharzia were found in 13 (12.26%) and 8 (7.55%) patients respectively. These results are similar to those of Kirakoya *et al.* [15] in Ouagadougou. These chronic infections can lead to irreversible inflammation of the spermatic ducts, resulting in obstruction.

67 patients, *i.e.* 25% of hypofertile men, had a history of surgery, and varicocele cure was the most common with a rate of 50.75% (34 patients), followed by inguinal hernia with a rate of 32.84% (22 patients).

The dilation of the scrotal veins caused by varicocele increases testicular temperature and alters sperm quality, which is not necessarily improved after a varicocele cure. It is also recognized that any operation in the pelvic or bursal region represents a potential risk factor for male infertility [16].

Of the 268 men, 61.94% consumed at least alcohol or tobacco. Smokers represented 29.10% of the population.

Tobacco is a risk factor for male hypofertility, as confirmed by several studies reported in the literature, which have shown that active smoking affects both sperm quantity and quality [17]-[19].

In our study population, over half (73.51%) had a high BMI, *i.e.* were overweight or obese. Our results are similar to those reported by Benamar *et al.* who also found a high BMI in more than half the patients. A BMI > 30 can have an impact on sperm quality, as fatty deposits can overload and influence androgen metabolism and cause alterations in sperm DNA.

In our series, OATS (17.54%), oligospermia (17.16%) and azoospermia (16.79%) were the most common etiologies. The results of Mbaye *et al.* [20] in Morocco are higher than ours, with 49.2% oligospermia and 37% azoospermia. Oligospermia (17.16%) was the most frequent qualitative disturbance and teratospermia (12.69%) the most frequent qualitative disturbance. Our results corroborate those of Budni da Silva *et al.* [21] in Brazil, but are inferior to those reported by Adjoby *et al.* [22] in Côte d'Ivoire.

60.07% of our patients had normal testicular ultrasound. Testicular hypertrophy/atrophy and varicocele were the most common anomalies found in our series. Several authors, such as Fouda *et al.* [23] and Halidou *et al.* [24], have found these two pathologies to be predominant, with 40.3% and 46.3% respectively, and 39.66% and 29.32% respectively.

Testicular biopsy is most indicated in cases of azoospermia, in order to search directly for spermatozoa within the testis, either in its parenchyma or in the epididymis. This procedure was not performed on any of the patients in our study, but will certainly be carried out in the future in couples presenting with azoospermia.

After testicular biopsy, if no spermatozoa are found, the couple's efforts to have a child will necessarily involve either sperm donation or adoption. This means that sperm donation is not yet legal in Burkina Faso, but the authorities are looking into the matter.

4.4. Factors Associated with Male Hypofertility

Our results show that age was associated with one quantitative sperm disturbance, namely oligospermia (P = 0.0001), and two qualitative disturbances, namely sperm motility (P = 0.0186) and morphology (P = 0.0001).

Firkh *et al.* [25] also reported in their study that age had a significant impact on the spermogram (P = 0.0002), with abnormalities in motility seen from the age of 31, vitality from the age of 40 and concentration from the age of 37.

Sperm quality and quantity deteriorate with age, but various studies have failed to determine a threshold age for decline.

Alcohol and tobacco consumption were associated with the majority of etiologies, namely disorders of sperm quantity, morphology, vitality and motility. The findings of Benabbou *et al.* [26] corroborate our own. Tobacco has been shown to affect sperm production, reducing it and its quality by 13 to 17% [27] [28].

There was a strong correlation between high-risk occupations (bakers, drivers, gold miners) and azoospermia, OATS and teratospermia. These results show some concordance with those reported by FIGO. This is explained by the deleterious effect of elevated temperatures and the use of toxic products associated with these professions on sperm quality and functionality [12].

Our study demonstrated a significant link between high BMI and oligospermia (P = 0.0001) and oligoasthenospermia (P = 0.0010). In fact, weight loss is associated with an improvement in hormonal profile and sperm quality, and weight loss of between 5% and 10% results in a marked improvement in all sperm parameters [29].

History of varicocele cure was associated with azoospermia and OATS (P = 0.0044), as was inguinal hernia surgery (0.001) and azoospermia.

Hormonal disorders, particularly FSH, were strongly associated with azoospermia (P = 0.0001). We counted 26 cases of azoospermia, *i.e.* 57.78% with high FSH and 24.44% with low FSH, pointing to secretory and obstructive aetiology respectively. Similar results to ours were reported by Niang *et al.* [20] (59.64% high FSH) and Halidou *et al.* [24] (64.58% high FSH) in the azoosperm population of their study.

5. Conclusion

Male infertility has various causes, hence the need for a methodical clinical and paraclinical investigation to recognize and act on each of them. The etiologies most commonly found in our series were abnormal sperm count, sperm motility and sperm morphology, with a combination of these three causes in several cases. Multiple factors—social, environmental, clinical and biological—all have an impact on male fertility, making it essential to master these potential factors for effective prevention and management.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Frydman, R., Flis-Trèves, M., Achour-Frydman, N. and Bruno, I. (2011) A Child, Finally/Pr René Frydman, Dr Muriel Flis-Treves, Pr Nelly Frydman. Hachette santé. https://www.mediathequesludotheques.grandorlyseinebievre.fr/JEUNESSE/doc/SYRACUSE/1256730/un-enfant-enfin-pr-rene-frydman-dr-muriel-flis-treves-pr-nelly-frydman

[2] International Classification of Diseases (ICD) (2023) https://www.who.int/standards/classifications/classification-of-diseases

[3] Faure-Pragier, S. (2004) Les bébés de l'inconscient. Presses Universitaires de France.

[4] Ministry of Health (2016) 2016 Directory. https://www.sante.gov.bf/accueil

[5] Kafando, J.G. (2020) Artificial Inseminations for Infertile Couples at the St Jérémie Clinic: Indications and Results from January 1, 2010 to December 31, 2019.

[6] Sakande, J., Sandjon, L., Ouedraogo, C., Konyaole, E., Kabre, E. and Sawadogo, M.

(2012) Profil hormonal féminin et pronostic de la réponse à la stimulation ovarienne au cours de l'Assistance Médicale à la Procréation: Expérience du Burkina Faso. *International Journal of Biological and Chemical Sciences*, **6**, 950-958. https://doi.org/10.4314/ijbcs.v6i3.4

[7] Agarwal, A., Mulgund, A., Hamada, A. and Chyatte, M.R. (2015) A Unique View on Male Infertility around the Globe. *Reproductive Biology and Endocrinology*, **13**, Article No. 37. https://doi.org/10.1186/s12958-015-0032-1

[8] Bourcigaux, N. and Christin-Maître, S. (2008) Dosages hormonaux chez l'homme infertile. *Gynécologie Obstétrique & Fertilité*, **36**, 551-556. https://doi.org/10.1016/j.gyobfe.2008.03.006

[9] Djire, P.M.A. (2022) Profil Epidémio-Clinique de l'Infertilité du Couple au Centre de Santé de Référence de Kalaban Coro.

[10] Benbella, A., Aboulmakarim, S., Hardizi, H., Zaidouni, A. and Bezad, R. (2018) Infertility in the Moroccan Population: Major Risk Factors Encountered in the Reproductive Health Centre in Rabat. *Pan African Medical Journal*, **30**, Article 195. https://doi.org/10.11604/pamj.2018.30.195.13849

[11] Niang, L., Ndoye, M., Labou, I., Jalloh, M., Kane, R., Diaw, J.J., *et al.* (2009) Profil épidémiologique et clinique de l'infertilité masculine à l'hôpital général de Grand-Yoff, Sénégal: A propos de 492 cas. *Basic and Clinical Andrology*, **19**, 103-107. https://doi.org/10.1007/s12610-009-0019-x

[12] Sun, H., Gong, T.-T., Jiang, Y.-T., Zhang, S., Zhao, Y.-H. and Wu, Q.-J. (2023) 10 Reasons for Male Infertility. https://doi.org/10.18632/aging.102497

[13] Moussa, D., Soumana, A., Amadou, S.M., Soli, I., Tahirou, I. and Ali, A. (2016) Profil hormonal chez l'homme en cas d'infertilité au laboratoire de radio immunologie de l'institut des radioisotopes de Niamey. *African Journal of Urology*, **22**, 305-309. https://doi.org/10.1016/j.afju.2016.01.008

[14] Benksim, A., Elkhoudri, N., Ait Addi, R., Baali, A. and Cherkaoui, M. (2018) Difference between Primary and Secondary Infertility in Morocco: Frequencies and Associated Factors. *International Journal of Fertility and Sterility*, **12**, 142-146. https://doi.org/10.22074/ijfs.2018.5188

[15] Kirakoya, B., Barnabé, Z., Abdoul Karim, P., Aristide, K.F., Clotaire, Y. and Amélie, N. (2015) Epidemiological and Clinical Profile of Male Hypofertility in Consultation at the Urology-Andrology of Yalgado Ouedraogo Teaching Hospital (Burkina Faso). *Advances in Sexual Medicine*, **5**, 1-6. https://doi.org/10.4236/asm.2015.51001

[16] Khodari, M. (2015) Azoospermie et antécédent de cure de hernie inguinale chez l'adulte. *Progrès en Urologie*, **25**, 856-857. https://doi.org/10.1016/j.purol.2015.08.283

[17] Evans, H.J., Fletcher, J., Torrance, M. and Hargreave, T.B. (1981) SPERM Abnormalities and Cigarette Smoking. *The Lancet*, **317**, 627-629. https://doi.org/10.1016/s0140-6736(81)91550-6

[18] Mak, V., Jarvi, K., Buckspan, M., Freeman, M., Hechter, S. and Zini, A. (2000) Smoking Is Associated with the Retention of Cytoplasm by Human Spermatozoa. *Urology*, **56**, 463-466. https://doi.org/10.1016/s0090-4295(00)00700-7

[19] Salvador, Z. (2019) Obesity and Sperm Quality: What Impact on Male Fertility? https://www.invitra.fr/qualite-seminale-et-obesite/

[20] Mbaye, M.M., Khalfi, B.E., Zakaria, A., Saadani, B., Louanjli, N. and Soukri, A. (2019) Epidemiology and Clinical Profile of Male Infertility at the Fertilization Centre IRIFIV in Casablanca, Morocco, around 295 Cases. *Annual Research & Review in Biology*, **32**, 1-6. https://doi.org/10.9734/arrb/2019/v32i630106

[21] Budni da Silva, M.C., Burato Wessler, L., Madeira, K. and Calice da Silva, C. (2017) Male Infertility Profile in an Assisted Human Reproduction Clinic from the South of Santa Catarina, Brazil, from 2012 to 2014. *Reprodução & Climatério*, **32**, 90-96. https://doi.org/10.1016/j.recli.2017.03.001

[22] Adjoby, R. (2023) Male Infertility at the CHU of Cocody about 280 Cases of Consultations. http://www.sago.sante.gov.ml/pdf2008/Nouvelles%20technologies%20en%20gyn%C3%A9co-obst/INFERTILITE%20MASCULINE%202007%20II.pdf

[23] Fouda, J., Mekeme, J.M., Owon'abessolo, P., Mbouche, L., Ngalle, F.E., Makon, A.N., *et al.* (2023) Paraclinical Aspects of Male Infertility at Yaoundé Central Hospital. *African Urology*, **3**, 27a-27d. https://doi.org/10.36303/auj.0041

[24] Halidou, M., Amadou Magagi, I., Zakou, A., Kodo, A., Adamou, H. and Amadou, S. (2022) Male Infertility at the National Hospital of Zinder: Epidemiological and Clinical Aspects: Male infertility at the National Hospital of Zinder: Epidemiology and Clinical Features. https://www.hsd-fmsb.org/index.php/hsd/article/view/3476

[25] Frikh, M., Benaissa, M., Kasouati, J., Benlahlou, Y., Chokairi, O., Barkiyou, M., *et al.* (2021) Prévalence de l'infertilité masculine dans un hôpital universitaire au Maroc. *Pan African Medical Journal*, **38**, Article 46. https://doi.org/10.11604/pamj.2021.38.46.19633

[26] Benabbou, A. and Bendahmane, M. (2013) Correlation between Active Smoking and Male Infertility. Study of Some Sperm Parameters of Smoking Subjects in Western Algeria.

[27] Vine, M.F. (1996) Smoking and Male Reproduction: A Review. *International Journal of Andrology*, **19**, 323-337. https://doi.org/10.1111/j.1365-2605.1996.tb00523.x

[28] Handelsman, D.J., Conway, A.J., Boylan, L.M. and Turtle, J.R. (1984) Testicular Function in Potential Sperm Donors: Normal Ranges and the Effects of Smoking and Varicocele. *International Journal of Andrology*, **7**, 369-382. https://doi.org/10.1111/j.1365-2605.1984.tb00794.x

[29] Karayiannis, D., Kontogianni, M.D., Mendorou, C., Douka, L., Mastrominas, M. and Yiannakouris, N. (2016) Association between Adherence to the Mediterranean Diet and Semen Quality Parameters in Male Partners of Couples Attempting Fertility. *Human Reproduction*, **32**, 215-222. https://doi.org/10.1093/humrep/dew288