Contents list available at Science Letters

Science Letters

journal homepage: http://www.scienceletters.org/

Epidemiological and Clinical Profile of Male Infertility at the IRIFIV Fertilization Center in Casablanca, Morocco, around 331 Cases

Amina Benzaouiya[1], Achraf Zakaria[3], Mustafa Zakaria[4], Sabri yassir[3], Abdelghani Mrini[1], Bouchra ElKhalfi[2], Abdelaziz Soukri[2], Modou Mamoune Mbaye*[2,3,4] and Noureddine Louanjli [2,3]

[1]*Biochemistry, Health, Nutrition and Environment (BioSaNE), Faculty of Science and Technology of Mahammedia, Hassan II University of Casablanca, Morocco*
[2]*Laboratory of Physiopathology, Genetics Molecular and Biotechnology (PGMB), Faculty of Sciences Ain Chock, Research Center, Health and Biotechnology, University Hassan II of Casablanca, Morocco.*
[3]*In Vitro Fertilization Center IRIFIV, IRIS Clinic, Casablanca, Morocco*
[4]*Laboratory of Medical Analyses, Reproductive Biology, Labomac, Casablanca, Morocco*
[5]*Department of Reproductive Biology and Assisted Reproductive Technology, Northwestern University, Evanston, Illinois, USA; 2IRIFIV, Fertility Center - ART IRIFIV Scientific Research Group (AISRG), Casablanca, Morocco*

ARTICLE INFO

Article History
Received 1 June 2021
Revised 21 July 2021
Accepted 23 July 2021
Available Online 24 July 2021

Keywords:
Male infertility,
sperm,
spermogram,
spermatocygram,
and abnormalities.

ABSTRACT

Infertility is a reproductive system condition defined as pregnancy after at least 12 months of regular unprotected sexual intercourse. Male infertility affects 10-15% of men of childbearing age and is associated with more than 1% of infertility cases, regardless of female involvement. The causes of male infertility are diverse and difficult to classify because they are sometimes complex and associated. They may concern different stages of sperm production or sperm transport and maybe acquired or congenital. For several years, the involvement of the environment in male infertility has been the subject of much research. When a man is treated for infertility, all factors that may impact fertility must be considered, and a complete workup must be performed. The aim of our work is to describe the general profile of male infertility in patients at the in vitro fertilization center (IRIFIV) Casablanca, Morocco. This is a retrospective and descriptive study of 331 patient records seen in consultation for a couple's marital infertility between January and October 2019. The mean age of the patients was 37.5 years. The mean duration of infertility was 5.5 years. Infertility was primary in 70.9% of cases and secondary in 29.1% of cases. Clinically, varicocele was the most frequent anomaly in 65.9% of the patients. The seminogram was disturbed in 72% of cases. The primary disturbances were oligozoospermia in 40.20 % of cases and asthenozoospermia in 37% of cases. The general pattern of infertility is polymorphous. The causes of the observed male infertility are multifactorial. Male infertility is usually caused by a quantitative and qualitative sperm abnormality. The improvement of infertility management must involve new research avenues, mainly genetic and immunological, to identify the usually hidden causes of infertility.

1. Introduction

According to the World Health Organization (WHO), infertility is defined as the absence of conception after at least 12 months of unprotected sex (Rowe *et al*., 2000). According to a national perinatal survey conducted in 2013 and the French fertility observatory in 2014, six percent of couples fail to have a child after 12 months of trying without contraception (Polis *et al*., 2017). This is a real public health problem, as one in ten teams will consult a specialist for difficulties in conceiving. According to the Moroccan Society of Reproductive Medicine (SMMR), one in eight Moroccan couples suffers from infertility, around 15%, and 17% of couples of childbearing ages are affected by infertility, the equivalent of no less than 825,000 people. Male infertility is a recent discovery because, as much as infertility was rampant within the couple, the causes were always sought in the woman. In the past, the man's responsibility for the couple's infertility was considered to be exclusively linked

*Corresponding Author: Modou Mamoune Mbaye
E-mail Address: mbayeass87@gmail.com
DOI: 10.46890/SL.2020.v02i06005

to impotence because, for many people, any man capable of coitus followed by ejaculation could not be infertile, so it was the woman who was accused of being unfit for procreation. Currently, it is known that 30% of infertility cases are related to the man, 30% to the woman, 30% to both, and the remaining 10% correspond to infertility problems with unknown origins (Huyghe *et al.*, 2013). The causes of male infertility are many and varied. It can result from an obstruction in the male genitalia, dilation of the veins surrounding the spermatic cord (testicular varicocele), an old infection, a genetic anomaly or a hormonal imbalance that ultimately affects the quality of the spermatozoa, which can result in an alteration of the sperm parameters, advanced paternal age, occupational exposure (heat and ionizing radiation), drugs, anatomical malformations, infections and infectious history, testicular cancer and its treatment, trauma and medication. In this context, scientists are not only looking for the share of responsibility of demographic developments, medical diagnostic and/or prognostic techniques, lifestyle, genetics, and environmental factors. Within this framework, we will determine the etiologies of male infertility; study the various risk factors that weaken sperm parameters, and the frequency of the various spermogram anomalies. To do this, we conducted an epidemiological, retrospective, and descriptive study of 331 patients seen in consultation for couple infertility between January and October 2019 at the *in vitro fertilization center, IRIFIV, Casablanca, Morocco.*

2. Material and Methods

2.1. Study population

2.1.1. Inclusion criteria

This study includes all patients who came to *the IRIFIV in vitro fertility center, Casablanca, Morocco* between January and October 2019 with a complete file.

2.1.2. Exclusion criteria

Patients with incomplete medical records, patients lost to follow-up or without 2 spermograms within 3 months were excluded from the study.

2.1.3. Selected population

Based on the above selection criteria, 331 medical records were selected for our study.

2.2. Data collection

An information or exploitation sheet was drawn up to collect all the information needed to meet the objectives of our study. The latter enabled us to carry out a descriptive analysis of each variable. In order to achieve our objectives, we retained the following parameters:

2.2.1. Epidemiological parameters

Age: This is determined for the patient and his or her spouse.

Marital status: Each patient must specify whether they are monogamous or polygamous.

Occupation: Each patient is asked to specify their occupation.

Heat exposures: Every patient is asked if they are exposed to high temperatures in the workplace.

Occupational exposures: to toxic agents including pesticides and heavy metals.

2.2.2. Clinical parameters

Type of infertility: primary or secondary.

Duration of infertility:

-For primary infertility: how many years the couple has wanted a child.

-For secondary infertility: how many years the couple has been unable to procreate after the last child.

Toxic habits: Tobacco and alcohol

Urogenital history: History of varicocele, hydrocele, testicular ectopy, inguinal hernia, orchitis, spermatic cord torsion, cryptorchidism, bursal trauma, testicular cancer, urogenital tuberculosis.

Surgical history: Hydrocele cure, unilateral orchiectomy, or inguinal hernia cure.

Clinical examination data: The clinical examination looks for signs of hypoandrogenism, the presence of a varicocele, an epididymal nodule or cyst, and the assessment of testicular volume using the Prader orchidometer.

2.2.3. Para clinical parameters

Spermogram data: semen volume, viscosity, sperm count, motile sperm count.

Hormonal assessment: FSH and testosterone levels.

Ultrasound of the scrotal contents: All the spermograms selected were carried out at the laboratory of medical analysis; Biology of reproduction (Labomac) Casablanca, a sexual abstinence of 3 to 5 days was required and respected. The sample was taken in the laboratory by masturbation. The semen is collected in a sterile, graduated, and capped 3centimeter glass or plastic bottle.

2.3. Type of study

This is a retrospective descriptive study involving 295 records of patients seen in consultation at the Medical Analysis Laboratory, Reproductive Biology (Labomac) Casablanca, for fertility disorders between January and October 2019.

2.4. Statistical analysis

The data obtained in our experiment are subject to a

statistical study. All the graphs and histograms represented in this study were produced using the software: GraphPadPrism7.

3. Results

We will present the results of our retrospective and descriptive study of the general profile of male infertility carried out at *the IRIFIV in vitro fertilization center, Casablanca, Morocco*. In particular, the results of the following parameters: clinical examinations, paraclinical examinations, etiologies of male infertility, the different risk factors that can weaken the sperm parameters, as well as the frequency of the various spermograms anomalies.

3.1. Age

Our study included a cohort of 331 patients. The mean age of the patients was 42.4 years, with extremes of 25 to 65 years. The age group between 35 and 40 years was the most represented with 101 cases, of which a percentage of 30.5% (Figure 1). Then we have the age group between 40 and 45 with a ratio of 28.7%, followed closely by the age group between 30 and 35, which represents 23.9% of the active population. Next, the age group between 25 and 30 constitutes 10.3%, almost 3.62% are between 45 and 50 years old, and 2.11% are between 50 and 55 years old, and finally, 0.60% are between 55 and 60 years old. In contrast, the age group between 60 and 65 recorded the lowest percentage with only 0.30 years.

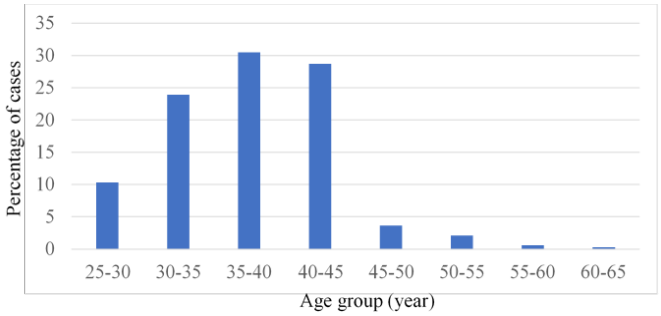

Figure 1 : Distribution of patients by age group in years.

3.2. Type of infertility

The two most frequent types of infertility are primary male infertility with 234 cases out of 331 or 70.69 %, and secondary male infertility with 97 cases out of 331 or 29.31 % (Table 1). Primary infertility is defined as a situation where no pregnancy has yet occurred in the couple [3]. And secondary infertility is resulting from a declared pregnancy, even if it was not carried to term or if one spouse has already had offspring with another partner (Snick *et al.*, 1997).

Table 1: Répartition des patients selon le type d'infertilité.

Type of infertility	Effective	Percentage (%)
Primary	234	70.69
Secondary	97	29.31
Total	331	100

3.3. Duration of the infertility course

The average duration of male infertility was 5 to 6 years, with extremes of 1 to 8 years (figure 2).

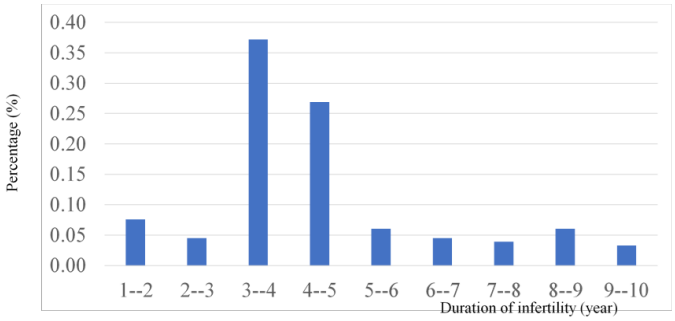

Figure 2 : Distribution of patients by duration of infertility in years

3.4. Marital status

All patients were monogamous (n=331), 100% of cases.

3.5. Toxic habits

3.5.1. Smoking status of patients

Regarding risk behaviors, among the cases studied, 30.51% of the patients (n= 101) were smokers compared to 69.49% of the patients (n=230) who did not smoke. In our study, the spermiological profile of smokers did not show a significant difference from the spermiological profile of non-smoking patients.

3.5.2. Alcohol consumption

On questioning, the notion of alcoholism was found in 29 patients, 8.76% of cases, and absent in 303 patients, 91.24% of cases.

3.6. Occupational exposure

Occupational exposure was found in 14.64% of the cases (n=14), including 9 civil servants, 2 shopkeepers, 2 taxi drivers, and 1 worker (Table 2).

Table 2 : Distribution of cases according to occupational exposure.

Professional exposure	Effective	Percentage (%)
Heat	37	11.18
Environmental toxins	23	6.95
Toxic agents	11	3.32
Radiation	0	0

3.7. Clinical parameters

3.7.1. Pathological history

Of the 331 patients we identified in this study, 53.53 % of patients (n=269) had no pathological history. However, for

the rest of the population studied, 23 patients (6.95 %) had a urogenital history, with a predominance of a history of urothelial orchitis in 40.7% of patients (n=12), followed by a history of cryptorchidism in 2.11 % of patients (n=7). History of bursal trauma in 3.02% of cases (n=10) and history of hydrocele cure in 1.20% of cases (n=4). A history of inguinal hernia repair was found in 1.02 % of cases (n=3). One patient had a history of pulmonary tuberculosis (Table 3).

Table 3 : Distribution of patient history.

Antecedents	Effective	Percentage (%)
Ourlienne Orchid	23	6,95
Trauma to the bursae	10	3,02
Cryptorchidism	7	2,11
Inguinal hermia cure	2	0,60
Hydrocele cure	4	1,20
Pulmonary tuberculosis	0	0

3.7.2. Clinical examination data

Varicocele was the most common clinical abnormality.

2.8. Para clinical parameters

According to the WHO 2010 criteria, the abnormalities found were quantitative and qualitative. The quantitative abnormalities were: oligozoospermia in 22 % of cases, azoospermia in 21% of cases. While the qualitative abnormalities noted were: asthenozoospermia in 40% of cases necrozoospermia in 17% of cases and teratozoospermia in 34% of cases (figure 3).

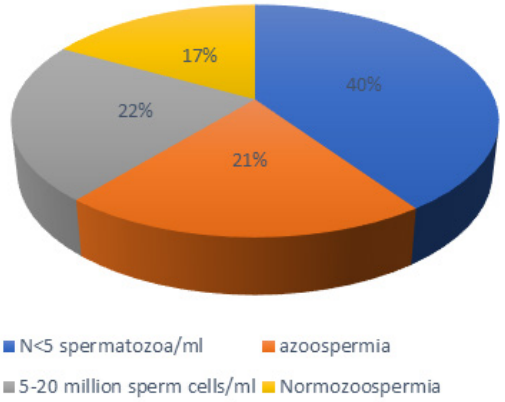

Figure 3 : Distribution of patients by sperm count / ml in patients with varicocele

3. Discussion

The number of patients consulting for infertility is increasing every year. The reason for this increase is that people are becoming more interested in their reproductive health. In France, more than 60,000 couples consult each year for infertility (Keiding *et al*., 2012). In the United States, the number of affected couples is 6 million (Westoff 1986). Worldwide, the number of infertile couples is estimated to be between 60 and 80 million. Approximately 15% of couples of childbearing ages seek help for possible infertility. Although the birth rate in Africa is the highest globally, infertility remains a significant socio-cultural problem, affecting 25-40% of the population and leading to serious social consequences: depression, extramarital sex, conflicts. Especially in Morocco, the purpose of marriage is to give birth to bring joy and harmony to the family (Low-2019). Age is a significant factor in determining the fertility of couples. In our study, the mean age of our patients was 42.42 years, with extremes ranging from 25 to 65 years. This result was in agreement with the data in the literature. Indeed, four studies, two of which were conducted in Senegal in 2008 and 2010 and two others in Morocco in 2017 and 2018 Al-Abbudi *et al* - Mbaye *et al*., 2019). These studies respectively indicated mean ages between 37 and 39.9 years, with extremes of 25 to 50 years. These results may be explained by some socio-economic factors that make marriage increasingly late (Mbaye *et al*., 2019) as biological ageing decreases the fertility potential of individuals, making it difficult for couples to conceive today (Cherlin, 2009) Primary infertility was the main cause of consultation. It accounted for 70.69% of cases. In comparison, secondary infertility accounted for 29.31% of cases. Our results are in perfect correlation with literature data such as those of Mamoune *et al*., Houssein *et al*., and Zait *et al*., respectively, in Fez (Morocco) and Annaba (Algeria). Their results were respectively 75.6% and 73.48% for Primary type infertility and 24.4% and 26.53% for Secondary type infertility Al-Abbudi *et al*.,; Mbaye *et al*., 2019; and Yilmaz *et al*., The high rate of primary type infertility is explained by the frequent tendency of childless couples to consult more than couples with one or more children Al-Abbudi *et al* and Thonneau *et al*., 2015). The average duration of infertility was 5.5 years, with extremes of 2 to 8 years. The duration of male infertility is in line with the literature, which indicates mean durations of 5.75 years with extremes of 1.5 and 20 years (Al-Abbudi *et al*., Mbaye *et al*., 2019). Occupational risk factors, including stress and environmental pollution, explain the particular representativeness of certain professions (Lykeridou *et al*., 2011). For the occupation of the driver, particularly exposed to environmental toxins, Thonneau *et al*, showed an increase in the average conception time for those with a driving time of more than 3 h / day. This time was 4.5 months compared to the control group, which had an average of 2.8 months with a significance of p <0.05 (Thonneau *et al*., 2015). For metalworking, baking, and cooking occupations, workstation temperature has contributed to increased scrotal temperature, thus contributing to the deterioration of infertility, especially in men. However, the lack of exposure characterization is a limitation for these studies. Therefore, there is a =22639sdinfertility (Oberdörster *et al*., 2005). Varicocele was the most common clinical anomaly. These data were far superior to those of other authors who found about 20-40% of cases in infertile patients (Mbaye *et al*., 2019). These disparities are due to a lack of consensus on the actual place of varicocele in male infertility. However, the high percentage of associated testicular atrophy is a criterion of severity. It may be explained by some of the histories found in our patients, but also by other etiologies (Sigman *et al*., 2018).

The alterations noted in the spermograms suggest the same thought. These may be chromosomal causes, as the lower the sperm count, the higher the prevalence of chromosomal abnormalities (Rives *et al.,* 2014). Chromosomal

abnormalities range from 3-7% in oligospermia to 13% in azoospermia (Al-Abbudi *et al;* Mbaye *et al*., 2019). The high rate of azoospermia, particularly associated with normal FSH levels, should also look for obstructive causes of infertility. Jarrow *et al*. have shown that FSH levels are about 7-12% and are much more common in azoospermic patients than in normozoospermic ones (Jarow *et al*., 1989; Jarrow *et al.,* 1989). The main cause of obstructive infertility is bilateral congenital agenesis of the vas deferens, which is best diagnosed by endorectal ultrasound (Al-Abbudi *et al*. and Mbaye *et al*., 2019). With the insignificance of our data on testicular biopsy, hormonology, and deferensography, we are not allowed to rule on the real etiologies of obstructive azoospermia in our region. The high rate of sexually transmitted infections, which cause seminal tract stenosis, is an additional risk factor for these obstructive inferences. Furthermore, the infectious balance revealed that chlamydia, mycoplasma, and Ureaplasma infections were common in infertile men; however, we did not establish the role of these infections on sperm parameters (Meng *et al*., 2015).

4. Conclusion

Although the current data from the epidemiological profile study is generally consistent with pre-existing studies, however, it must be recognized that the availability of new data is rare. The description of specific information will help to improve health, define policies and improve education. The prevalence of infertility and patient demand is increasing due to new environmental and socio-economic risk factors. The presence of assisted reproduction centers is proof of this.

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