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HEPATITIS B VIRUS SEROPREVALENCE AND IMPACT ON FERTILITY IN COUPLES AT THE GYNAECOLOGICAL ENDOSCOPIC SURGERY AND HUMAN REPRODUCTIVE TEACHING HOSPITAL, CAMEROON

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Abstract: -

Introduction: *Hepatitis B virus (HBV) has been shown to have adverse effects on fertility in both women and men.* ***Objective:*** *to determine the seroprevalence of the hepatitis B virus and its impact on fertility in couples followed for infertility at the Gynaecological Endoscopic Surgery and Human Reproductive Teaching Hospital, Cameroon.* ***Materials and Method:*** *an analytical cross-sectional study was conducted over a period from January 1 to September 1, 2019, i.e., a period of 9 months at GESHRTH. Complete records were included in our study consecutively. Qualitative variables were compared using a Chi² test or Fisher's exact test using Epi Info software version 3.5.4. The statistical significance threshold was set at 5%.* ***Results and discussion:*** *of the 279 couples selected, 54/558 (9.7%) people were positive for HBsAg including 33 (11.8%) women and 21 (7.5%). HBsAg-negative women were 5.55 times more likely to have uterine myomas (p = 0.006) and HBV-infected men were 7 times more likely to develop a sperm abnormality (p = 0.002) and 4 times more likely to have oligospermia (p = 0.005).* ***Conclusion:*** *the prevalence of HBV infection in couples followed for infertility remains high. HBV could have an impact on the occurrence of uterine myomas and sperm abnormalities.*

Keywords: *HBV; couple infertility; Impact; GESHRTH; Cameroon.*

INTRODUCTION

Hepatitis B virus (HBV) can cause life-threatening liver infections. It represents a major public health problem. According to the World Health Organization (WHO), HBV is 50 to 100 times more contaminating than the Human Immunodeficiency Virus (HIV). In 2019, the WHO estimated that 296 million people were living with chronic hepatitis B (defined as the presence of hepatitis B surface antigen) [1]. In Cameroon, its overall prevalence has been estimated at 11.2%, making this country one of the most affected in the world [2]. HBV has also been found in extrahepatic tissues such as kidneys, ovaries, testes and in semen. It has been shown that this virus can have harmful effects on fertility in both women and men [3, 4]. Several studies have noted a significant and negative impact on sperm parameters [5, 6]. Moreover, HBV mainly leads to higher abortion and miscarriage rates [4]. In Africa, a couple without children is still considered to be a social failure and the resulting psychosocial repercussions are often heavy in consequence [7, 8]. Couple infertility is a real public health problem. It is a condition of the male or female reproductive system defined by the inability to achieve pregnancy after 12 months or more of regular unprotected intercourse [9]. The WHO estimates that between 48 million couples and 186 million people are affected by infertility worldwide [8]. Its high incidence in Africa is linked to the high prevalence of complications from unsafe abortions, postpartum infections and bacterial, parasitic and viral sexually transmitted diseases (STDs) [10, 11]. However, there are very few studies carried out to date in our context on HBV and its impact on fertility. The objective of our study was to determine the seroprevalence of the hepatitis B virus and its impact on fertility in couples followed for infertility at the Gynaecological Endoscopic Surgery and Human Reproductive Teaching Hospital (GESHRTH).

Materials and Method

Study type, location and period

An analytical cross-sectional study was conducted over a period from January 1 to September 1, 2019, i.e., a period of 9 months at GESHRTH. The latter is a reference site in medically assisted procreation located in the city of Yaounde in Cameroon.

Study population

The target population consisted of records of couples followed for infertility at GESHRTH. Files containing the results of HBsAg, co-infections, spermogram and pelvic ultrasound were included in our study and incomplete files were excluded. The mode of recruitment was consecutive and not probabilistic.

Procedure

The selection of the files was made in the archiving service of the hospital center after having obtained the authorization of research from the administration. All the files meeting our selection criteria were scrupulously analyzed in order to extract the data necessary for our study. The information was collected using a questionnaire previously tested and validated with a coding to guarantee the anonymity of the participants.

Study variables

They consisted of sociodemographic data (age, sex, marital status), those relating to the type and origin of infertility, the results of the spermogram and pelvic ultrasound and the result of the HBsAg.

Statistical analysis

The data collected was recorded and analyzed using Epi Info version 3.5.4 and Excel 2013 software. The quantitative variables were described by their central tendencies (mean, standard deviation, maximum, minimum). Qualitative variables were expressed as counts and proportions and compared using a Chi^2 test or Fisher's exact test when indicated. The strength of association was measured by the odds ratio (OR) with 95% confidence interval (95% CI). The statistical significance threshold was set at 5% ($p < 0.005$).

Ethical considerations

To carry out this work, we obtained a research authorization from GESHRTH, associated with an ethical clearance from the ethics committee of the Faculty of Medicine and Biomedical Sciences of Yaounde (FMBS). The information collected was used exclusively within the framework of this study and in strict compliance with medical secrecy.

Results

Sociodemographic characteristics

A total of 279 couples followed for infertility at GESHRTH were selected. The age in women ranged from 20 to 54 years and in men from 29 to 88 years. The age groups most represented among women were those of 30-34 and 35-39 years, i.e., 25.8% (72) each, and among men, that of 50 years and over, i.e., 34.4% (96). The average age in women is 36.57 ± 6.79 years and in men 45.92 ± 10.09 years. The population was mainly made up of married couples (213; 76.3%) living in urban areas (276; 98.9%) (see Table I).

Table I: Breakdown of the study population according to socio-demographic data

Variables	Females (N=279)		Males (N=279)	
	n	%	n	%
Age range				
20-24	6	2.1	0	0
25-29	33	11.8	3	1.1
30-34	**72**	**25.8**	15	5.4
35-39	**72**	**25.8**	78	27.9
40-44	63	22.5	48	17.2
45-49	24	8.6	39	13.9
≥50	9	3.2	96	**34.4**

	Couple (N=279)	
	n	%
Marital status		
Common-law (unmarried)	66	23.7
Married	213	**76.3**
Place of residence		
Rural area	3	1.1
Urban area	276	**98.9**

Etiology of infertility

Primary infertility was mainly present in 204 couples, i.e., 73.1%. In the 279 women, 80.7% (225) of the anomalies encountered were morphological. The most represented morphological abnormalities were tubo-ovarian adhesions, i.e., 48.4% (135), followed by uterine fibroids, i.e., 32.2% (90). Concerning the men, 50.9% (142) had spermogram abnormalities among which n found oligospermia (42.7%), followed by azoospermia (7.2%) (see table II).

Tableau II: Distribution of the study population according to the type and origin of infertility

Variables	Number N=279	Percentage (%)
Type of couple infertility		
Primary infertility	204	**73.1**
Secondary infertility	75	26.9
Female origin		
Morphological abnormalities	225	**80.7**
Others	54	19.3
Male origin		
Spermogram abnormalities	142	**50.9**
Others	137	49.1

Prevalence of hepatitis B virus in couples followed for infertility

In our population of 279 couples or 558 people, 54 (9.7%) were positive for HBsAg. More precisely, 33 women were positive for HBsAg, i.e., a prevalence of 11.8% and 21 men were also positive, i.e., 7.5% (see figure 1).

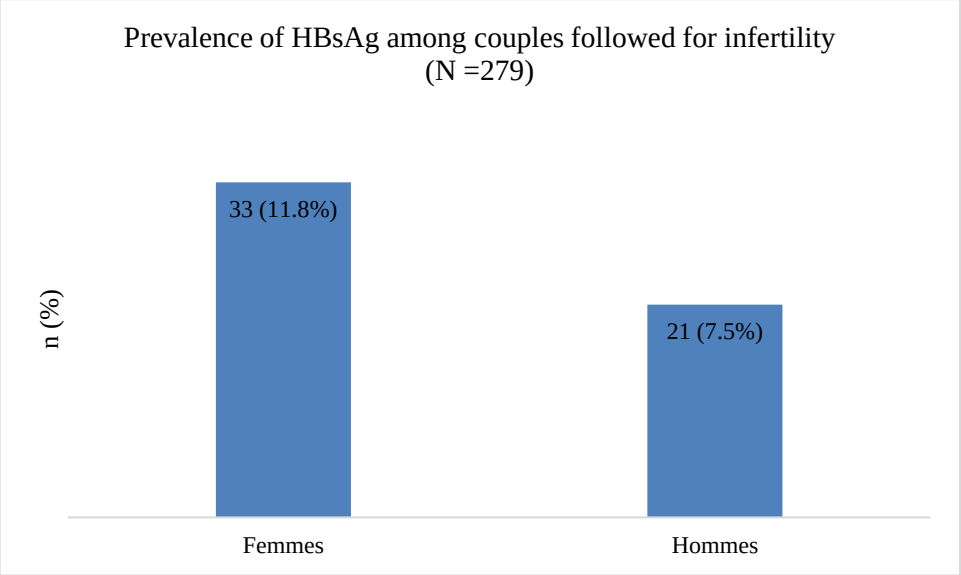

Figure 1: Prevalence of hepatitis B virus in couples followed for infertility in our study

Impact of the hepatitis B virus in couples followed for infertility

Uterine fibroids, oligospermia and absence of spermogram abnormality were associated with hepatitis B virus. In fact, HBsAg seronegative women had a 5.55 times greater risk of having uterine fibroids (p = 0.006) and men infected with HBV had 7 times more risk of developing a sperm abnormality (p = 0.002) and more precisely 4 times more risk of having oligospermia (p = 0.005) (see table III).

Table III: Impact of the hepatitis B virus in women and men followed for infertility in our study

Variables	HBsAg female serology		OR (95% CI)	p-value
	Positive n = 33 (%)	**Negative n = 246 (%)**		
Pelvic abnormalities	9 (27.3)	45 (18.3)	1.68 (0.73-3.85)	0.224
Uterine fibroids	3 (9.1)	87 (35.4)	0.18 (0.05-0.62)	**0.006**
Tubo-ovariens adhesions	21 (63.6)	114 (46.3)	2.03 (0.96-4.30)	0.066
	HBsAg male serology			
	Positive n = 21 (%)	**Negative n = 258 (%)**		
Spermogram abnormalities	18 (85.7)	118 (45.7)	7.14 (2.04-25.0)	**0.002**
Oligospermia	15 (71.4)	99 (38.4)	4.02 (1.51-10.69)	**0.005**
Azoospermia	3 (14.3)	16 (6.2)	2.52 (0.67-9.46)	0.171
Asthenospermia	0 (0.0)	3 (1.2)	-	0.257

OR : Odd ratio, CI : Confidence interval

Discussion

At the end of our study, the general objective of which was to determine the seroprevalence of the hepatitis B virus and its impact on fertility in couples followed for infertility at GESHRTH, the age groups most represented in women were those 30-34 and 35-39 years old, i.e., 25.8% (72) each. This is in agreement with the result of Adedigba et al in Nigeria in 2020 which demonstrated that the age group 31-35 years had the highest frequency of infertility [12]. This could be explained by the delay in women's desire for pregnancy linked to social priorities such as the desire for a career, the instability of the labor market which leads women to plan their pregnancy later and later. The most represented age group among men is that of 50 years and over, i.e., 34.4%, which is in agreement with certain studies which have shown that male aging has a definite effect on reproduction and sexuality [11, 13, 14]. Primary infertility was mainly present in 204 couples, i.e., 73.1%. This is different from what was noted in a literature review on infertility in Africa where the proportion of primary and secondary infertility is approximately equal [11]. This difference could be related to the mode of recruitment because our study only took into account couples followed for infertility in a specialized center. The most represented morphological abnormalities were tubo-ovarian adhesions, i.e,. 48.4% (135). This result is similar to that

obtained by Adedigba et al who revealed that women with hydrosalpinx were 2.11 times more likely to be sterile than those without hydrosalpinx [12]. In men, 50.9% of the pathologies of the spermogram were found as the first cause of their infertility. Spermogram abnormalities were mainly oligospermia (42.7%) followed by azoospermia (7.2%). This result is comparable to that of Matumo et al, in Butembo (Democratic Republic of Congo) in 2020 which showed that 46% of the men of infertile couples presented anomalies in their spermogram with 10.4% of the cases of azoospermia which showed that 46% of men in infertile couples presented abnormalities in their spermogram with 10.4% of cases of azoospermia [15]. Regarding Viral Hepatitis B, 9.7% of our study population was positive for HBsAg. This is in agreement with the prevalence of Hepatitis B in Cameroon in 2017 which was estimated at 11.2% [2]. The presence of sperm abnormalities more specifically oligospermia was associated with hepatitis B virus in our study. This result is in agreement with the results of Qian et al in 2016 which showed that semen volume, semen pH, sperm density, percent advancement, sperm movement, sperm activation rate, sperm survival rate, normal sperm morphology rate in HBV-infected infertile men were significantly lower than in infertile men without genital infection and normal men [16]. Regarding the association between the presence of uterine myomas and the hepatitis B virus, it seems important to confirm this link by increasing the size of the sample because no study to date has notified this observation. Our study was carried out in a single center so the results cannot be generalized, however GESHRTH is the reference hospital for the care of infertile couples wishing to have children.

Conclusion

The prevalence of HBV infection in couples followed for infertility is not different from that of the general population in Cameroon. It remains high in this group of individuals. HBV could have an impact on the occurrence of uterine fibroids and sperm abnormalities including oligospermia. The harmful effect of HBV would require further studies to understand its consequences and see its implications for medically assisted procreation.

Thanks

The research team would like to thank the administrative and technical staff of GESHRTH.

Conflicts of interest

The authors declare that they have no conflict of interest.

Contribution of the authors

Voundi Voundi Joseph Emmanuel, Noa Ndoua Claude and Voundi Voundi Esther designed the study. Ngono Vanina, Nyimbe Mviena Louise and Sahmo Simon Stevensen carried out the data collection. Belinga Etienne, Voundi Voundi Joseph Emmanuel, Voundi Voundi Esther and Nyada Serge carried out the statistical analysis. Voundi Voundi Joseph Emmanuel, Voundi Voundi Esther, Nyada Serge and Nyimbe Mviena Louise wrote the manuscript. Ayangma Celestin Roger, Noa Ndoua Claude, Voundi Nguefack Tsague and Toukam Michel proceeded to the critical reading of the manuscript. All authors have given their approval for publication.

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