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Seroprevalence of Viral Infections in Homes Submitted to Assisted Reproduction

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Abstract

Introduction: The serologies for HIV screening, hepatitis B and C and Zika virus are routine in infertility research.

Objectives: To establish the seroprevalence of these viral infections in couples submitted to assisted reproduction and compare the seroprevalence of these infections in the group of patients who underwent intrauterine insemination or in-vitro fertilization.

Methods: An retrospective analytical study with a survey of the cases of couples submitted to assisted human reproduction techniques carried out in a public institution (Human Reproduction Laboratory of the Clinical Hospital of the Federal University of Goias-LabRep (HC/UFG) and in a private clinic (Fertile), with serologies for the Zika virus, HIV, hepatitis B virus and hepatitis C, from July 2016 to July 2017.

Results: 871 patients were evaluated, of which 186 were from LabRep-HC/UFG and 685 from Fertile Clinic. From the total number of patients analysed: 636 underwent IVF/ICSI treatment and 235 underwent IUI.

Conclusion: There was no difference between the prevalence of the diseases analysed considering the sex and the type of clinic the patients belonged. The overall prevalence of hepatitis B, hepatitis C, HIV and Zika was 0.57%, 0.57%, 0.46% and 0.23%, respectively. Considering the techniques of assisted reproduction, all cases of hepatitis B and C were from patients who underwent in-vitro fertilization/intracytoplasmic injection in-vitro, with a statistically significant difference compared to couples who underwent intrauterine insemination. Comparing the two clinics where the couples performed the assisted reproduction treatments, there wasn't significant difference between the prevalence of the infections analysed. There was also no significant difference between the prevalence of the diseases surveyed when compared to the two clinics, for each treatment performed, whether high or low complexity.

Keywords: Serologies; Infertility research; Seroprevalence; Viral infections

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Introduction

Human acquired immunodeficiency virus (HIV), hepatitis B (HBV) and hepatitis C (HCV) are highly prevalent worldwide, affecting mainly adults of childbearing age. Already the first cases of Zika virus infection in Brazil were notified in 2014, culminating in an unprecedented epidemic in the country. The serologies for the tracing of these viruses are routine in the investigation of infertility [1-3].

New drug therapies for the treatment of HIV, hepatitis B and hepatitis C have offered greater control of the infection, allowing better quality and longer life expectancy for those affected [4-6].

These factors result in an increase in the desire for paternity and motherhood by infected couples and, consequently, lead to an increased demand for assisted reproduction techniques that minimize the risks of viral transmission, as well as to overcome the frequent subfertility in these couples [6,7].

The importance of the diagnosis of Zika virus is based mainly on the probability of the association between this virus and microcephaly, being the spring force for the demand for a differentiated attention to the candidates for assisted reproduction [8,9].

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Sanitária (ANVISA), in the use of the attribution granted by subsection IV of art. 11 of the Regulation approved by Decree nº 3.029, of 16 April 1999, approved in 2006 the technical regulation establishing the requirements for the operation of germ cell and tissue banks (BCTG), establishing the minimum criteria for the operation of BCTGs aiming for the safety and quality of the cells, germ tissues and embryos used, applying to all establishments of public or private nature that carry out activities with cells, germ tissues and embryos, for own use or donation [10].

The objective of this study is to evaluate the importance of screening for viral infections in couples submitted to assisted human reproduction techniques.

Methods

This is an observational retrospective analytical study, with a survey of the cases of couples submitted to techniques of assisted human reproduction, in a public institution (Laboratory of Human Reproduction of the Clinical Hospital from the Federal University of Goiás-LabRep-HC/UFG and in a private clinic (Fertile), with serologies for Zika virus, HIV, hepatitis B and hepatitis C, from July 2016 to July 2017. The initial n sample was 983 patients and the final n sample was 871, of which 186 were from the LabRep-HC/UFG (group A) and 685 from fertile clinic (group B). One hundred and twelve patients were excluded from the study because they presented incomplete data in the medical record. Patients underwent low complexity techniques (intrauterine insemination-IUI) and high complexity (*in-vitro* fertilization-IVF, *in-vitro* intracytoplasmic injection-ICSI). Regarding the ethical aspects, it should be emphasized that the research was grounded in accordance with Resolution n. 466/2012, thus the rights of those involved are assured and approved by the Research Ethics Committee of the Clinical Hospital of the Federal University of Goiás.

Results

A total of 871 patients were evaluated, of which 186 were from LabRep-HC/UFG (group A) and 685 from Clínica Fertile (group B).

Of the total number of patients analysed, 636 underwent IVF/ICSI treatment and 235 underwent IUI (Tables 1-6).

Discussion

A total of 983 patients who were submitted to assisted reproduction treatments at the Human Reproduction Laboratory of the Clinical Hospital of the Federal University of Goiás (Group A) or at the Fertile Clinic (Group B) were analysed from July 2016 to July 2017. Of these, 112 were excluded from the study

Table 1 Prevalence of viral infections in couples submitted to assisted reproduction, Goiania, 2017.

Viral infection	Number of cases (n=16)	
	n	%
Hepatitis B	5	0,57
Hepatitis C	5	0,57
Hiv	4	0,46
Zika	2	0,23

Test: Logistic binary regression analysis

Table 2 Total prevalence of viral infections in pairs submitted to assisted reproduction, considering the technique used, Goiania, 2017.

Viral infection	Type of treatment				OR	p
	IVF/ICSI (n=14)		IUI (n=2)			
	n	%	n	%		
Hepatitis B	5	0,79	0	0,00	0,999	< 0,001
Hepatitis C	5	0,79	0	0,00	0,999	< 0,001
Hiv	3	0,47	1	0,43	0,929	0,902
Zika	1	0,16	1	0,43	0,481	2,714

Test: Logistic binary regression analysis

Table 3 Prevalence of viral infections in couples submitted to assisted reproduction, in each analysed clinic, Goiania, 2017.

Viral infection	Clinica				p
	LabRep HC-UFG (n=5)		Fertile (n=11)		
	n	%	n	%	
HEPATITIS B	2	1,08	3	0,44	0,291
HEPATITIS C	1	0,54	4	0,58	1,000
HIV	1	0,54	3	0,44	1,000
ZIKA	1	0,54	1	0,15	0,382

Test: Chi square

Table 4 Prevalence of any viral infection in couples submitted to assisted reproduction, considering the clinic where the treatment was performed, Goiania, 2017.

	Clinic				p
	LabRep HC-UFG (n=5)		Fertile (n=11)		
	n	%	n	%	
Presence of any viral infection analysed	5	2,69	11	1,61	0,355

Test: Chi Square

Table 5 Prevalence of viral infections in couples submitted to IVF / ICSI in each clinic analysed, Goiania, 2017.

Viral infection	Clinica				p
	LabRep HC-UFG (n=4)		Fertile (n=10)		
	n	%	n	%	
HEPATITIS B	2	2,06	3	0,56	0,169
HEPATITIS C	1	1,03	4	0,74	0,564
HIV	1	1,03	2	0,37	0,392
ZIKA	0	0,00	1	0,19	1,000
All	4	4,12	10	1,86	0,247

Test: Fisher's Exact

because they had incomplete data in the medical record, leaving, therefore, 871 patients.

Of these, 186 patients belonged to LabRep-CH/UFG and 685 performed the treatments at Clínica Fertile. Treatments involved both high and low complexity techniques, being that of the total of patients analysed, 636 were submitted to IVF/ICSI treatments and 235 were submitted to IUI.

Of the total number of patients who underwent *in-vitro* fertilization or intracytoplasmic injection *in-vitro*, 97 belonged

Table 6 Prevalence of viral infections in couples submitted to intrauterine insemination (IUI) in each clinic analysed, Goiania, 2017.

Viral infection	Clinica				p
	LabRep HC-UFG (n=1)		Fertile (n=1)		
	n	%	n	%	
HEPATITIS B	0	0	0	0	**
HEPATITIS C	0	0	0	0	**
HIV	0	0	1	0,68	1,000
ZIKA	1	1,12	0	0,00	0,379
All	1	1,12	1	0,68	1,000

Test: Fisher's exact; **There was no test

to Group A and 539 to Group B, while 89 of the total number of intrauterine inseminations were LabRep-HC/UFG patients and 146 belonged to Fertile Clinic.

Of all positive serologies in group A, three (60%) occurred in male patients and two (40%) in female patients. In group B, of the total number of viral infections, seven (63.6%) occur in men and four (36.4%) in women. There was no difference in the prevalence of the diseases analysed considering the sex and the clinic to which the patients belonged. Prevalence data of viral infections in couples submitted to assisted reproduction techniques coincide with that presented.

In this study, the virus infections from hepatitis B and C were the most common. The overall prevalence of hepatitis B, hepatitis C, HIV and Zika was 0.57%, 0.57%, 0.46% and 0.23%, respectively (**Table 1**). The analysis, which involved 138 couples from an assisted reproduction private clinic in Nigeria, also demonstrated that hepatitis B was the most prevalent in that group.

In Brazil, the overall prevalence score for the marker of exposure to hepatitis B virus (anti-HBc) was 7.4%. For the HBsAg marker, the overall prevalence global concerning for all Brazilian capitals was 0.37% (95% CI 0.25% -0.50%). In the central-west region, the prevalence of this infection was 0.3% (CI 95% 0.20% -0.50%), being considered of low endemicity similar to that found in the population of this analysis [11].

For hepatitis C, the overall prevalence result for all Brazilian capitals was 1.38% (95% CI 1.12% -1.64%). Thus, the endemicity of HCV infection has been found to be low. The prevalence of hepatitis C in the centre-west region was 1.3% (95% CI 1.0% -1.7%), coinciding with the national average and with this study [11].

The prevalence rate of HIV infection in the Brazilian population aged 15 to 49 years has remained stable at 0.6% since 2004, being 0.4% among women and 0.8% among men [11,12]. The prevalence in the group studied was statistically similar.

Infertile and serodiscordant couples for HIV should be informed that transmission of the virus during assisted reproduction techniques is possible, and the real risk is still unknown [13]. The analysis of Osenwenkha et al. [13] revealed that HIV seroprevalence was insignificant in relation to the total number of infertile women analysed, as in the present study. In Brazil [14]

were recorded 215,319 probable cases of Zika fever (incidence rate of 105.3 cases/100 thousand inhabitants) distributed in 2,306 municipalities, and were confirmed 130,701 cases (60.7%). In 2017, up to the beginning of February, 316 probable cases of Zika fever were recorded in the country, with an incidence rate of 0.2 case/100 thousand inhabitants; of these, 58 (18.4%) were confirmed [14].

The analysis of the incidence rate of probable cases (number of probable cases/100 thousand inhabitants) shows a low incidence in all geographic regions so far, a fact that also occurred in this study, being also the least prevalent infection groups A and B [14].

Considering the techniques of assisted reproduction, all cases of hepatitis B and C were from patients who underwent in-vitro fertilization/intracytoplasmic injection in-vitro, with a statistically significant difference compared to the couples who underwent intrauterine insemination (**Table 2**). It has been shown that, in addition to sperm washing in cases of men with hepatitis C, the highly complex techniques reduce the risk of transmission of this infection to the respective partner [15,16]. In the case of serodiscordant couples for hepatitis B, the seronegative partner should be immunized against the virus of this infection, and sperm lavage is not necessary [16].

Comparing the two clinics where the couples performed the assisted reproduction treatments, there was no significant difference between the prevalence of the infections analysed (**Tables 3 and 4**). There was also no significant difference between the prevalence of the diseases surveyed when comparing the two clinics, for each treatment performed, whether high or low complexity (**Tables 5 and 6**).

Conclusion

The seroprevalence of hepatitis B, hepatitis C, acquired immunodeficiency virus and Zika virus in couples submitted at assisted reproduction was 0.57%, 0.57%, 0.46% and 0.23%, respectively.

There was no difference in the prevalence of infections analysed among patients submitted to assisted reproduction techniques in the public and private institution.

There was a significant difference in the prevalence of hepatitis B and C in couples submitted to in-vitro fertilization/intracytoplasmic injection in-vitro and those who underwent intrauterine insemination, being higher in the first group. The importance of tracking viral infections in pairs submitted to assisted human reproduction techniques is crucial, since it is a treatment that requires a fairly high financial investment and generates a great deal of emotional waste when treatment is frustrated. Also, this screening is important to reduce unfavourable effects in relation to pregnancy, in addition to reducing neonatal morbimortality, including the risk of malformations such as microcephaly associated with Zika virus.

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